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INDEX TO VOL. XII.

LIST OF ILLUSTRATIONS

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THE PENNY MAGAZINE

OF THE

Society for the Diffusion of Useful Knowledge.



[Sir Roger de Coverley and the 'Spectator.']

SIR ROGER DE COVERLEY.—No. I.

It is pleasant to reflect upon the imperishable quality of many of those things, apparently trifling, which have the power of contributing to innocent enjoyment. The sports of childhood are essentially ancient. The top and the hoop have outlived many generations. There is a famous picture by Lionardo da Vinci, in which a boy is playing with the pretty toy in which a number of flat boards are fastened by tapes—at once dissevered and united; and the toy is still sold for a halfpenny at the corner of every street. To ascend in the scale of enjoyment, the melody which was delightful in the days of Queen Elizabeth is forgotten, perhaps, for two hundred years, and it suddenly springs into popularity in the days of Queen Victoria. For a quarter of a century country-dances were out of fashion. They are reviving; and with them comes back one of the oldest and most beautiful, with its courteous advances, from the extremities of a long line, of the lady and the gentleman,—their turnings in the centre,—their returnings,—the chain figure in which the lady winds through a line of gentlemen, and the gentleman through a line of ladies—and lastly, the arched hands under which every couple passes. This is Roger de Coverley, or Roger of Cowley. Cowley is a pretty village about two miles from Oxford; and here some one lived in the days of the Tudors who was famous enough to have his name linked with the pretty dance-tune that has once again become fashionable. But he had a higher honour. The popularity of the dance in the days of Queen Anne gave a name to the most famous character in 'The Spectator;' and ever afterwards the dance itself gathered an accession of dignity even in its name; and plain Roger of Cowley became *Sir* Roger *de* Coverley.

The revival of the dance is propitious to our attempt to revive, for the general reader, those delightful papers of Addison and Steele which are devoted to the fictitious character of Sir Roger. Few people now read 'The Spectator' as a whole. Some of the more celebrated essays, such as 'The Vision of Mirza,' find their place in books of extract. The delicate humour of the delineation of Sir Roger de Coverley is always referred to as the highest effort of Addison's peculiar genius: but not many will take the pains to select

these sixteen or seventeen papers from the six hundred and thirty which form the entire work. These papers have a completeness about them which show how thoroughly they were written upon a settled plan. Steele appears to have first conceived the character in the second number of 'The Spectator,' but Addison very soon took it out of his friend's hands, who was scarcely able to carry on the portraiture with that refinement which belonged to Addison's conception of the character. Addison, it is said, killed Sir Roger in the fear that another hand would spoil him.

As a representation of manners a century and a half ago, the picture of Sir Roger de Coverley has a remarkable value. The good knight is thoroughly English; and in him we see a beautiful specimen of the old fashioned gentleman, with a high soul of honour, real benevolence, acute sense mixed up with the eccentricities which belong to a nation of humourists. The readers of 'The Spectator' are fast diminishing. No one now gives 'his days and nights to the volumes of Addison;' but his gentle graceful humour has never been excelled, and nowhere is it more conspicuous than in the papers of which Sir Roger de Coverley is the hero.

The plan of 'The Spectator' is founded upon the fiction of a club that assembles every Tuesday and Thursday to carry on the publication. Sir Roger does not appear highly qualified for a literary college—a *col laborateur* as the French style it,—but he nevertheless is the foremost in 'The Spectator's' account of those gentlemen who are concerned with me in the work.

"The first of our society is a gentleman of Worcestershire, of an ancient descent, a baronet, his name Sir Roger de Coverley. His great-grandfather was inventor of that famous country-dance which is called after him. All who know that shire are very well acquainted with the parts and merits of Sir Roger. He is a gentleman that is very singular in his behaviour, but his singularities proceed from his good sense, and are contradictions to the manners of the world, only as he thinks the world is in the wrong. However, this humour creates him no enemies, for he does nothing with sourness or obstinacy; and his being unconfined to modes and forms makes him but the readier and more capable to please and oblige all who know him. When he is in town he lives in Soho Square. It is said he keeps himself a bachelor by reason he was crossed in love by a perverse beautiful widow of the next county to him. Before this disappointment Sir Roger was what you call a fine gentleman, had often supped with my Lord Rochester and Sir George Etherege, fought a duel upon his first coming to town, and kicked bully Dawson in a public coffee-house for calling him youngster. But being ill used by the above-mentioned widow, he was very serious for a year and a half; and though, his temper being naturally jovial, he at last got over it, he grew careless of himself, and never dressed afterward. He continues to wear a coat and doublet of the same cut that were in fashion at the time of his repulse, which, in his merry humours, he tells us has been in and out twelve times since he first wore it. He is now in his fifty-sixth year, cheerful, gay, and hearty; keeps a good house both in town and country; a great lover of mankind; but there is such a mirthful cast in his behaviour, that he is rather beloved than esteemed.

"His tenants grow rich, his servants look satisfied, all the young women profess love to him, and the young men are glad of his company. When he comes into a house he calls the servants by their names, and talks all the way up stairs to a visit. I must not omit that Sir Roger is a justice of the quorum; that he fills the chair at a quarter-session with great abilities, and three months ago gained universal applause by explaining a passage in the Game Act."

We hear little of Sir Roger except an occasional opinion till we reach the 106th number, when Addison takes up the man of whom he said 'we are born for each other.'

"Having often received an invitation from my friend Sir Roger de Coverley, to pass away a month with him in the country, I last week accompanied him thither, and am settled with him for some time at his country-house, where I intend to form several of my ensuing speculations. Sir Roger, who is very well acquainted with my humour, lets me rise and go to bed when I please, dine at his own table or in my chamber, as I think fit, sit still and say nothing without bidding me be merry. When the gentlemen of the country come to see him, he shows me at a distance. As I have been walking in his fields, I have observed them stealing a sight of me over a hedge, and have heard the knight desiring them not to let me see them, for that I hated to be stared at.

"I am the more at ease in Sir Roger's family because it consists of sober staid persons; for as the knight is the best master in the world, he seldom changes his servants; and as he is beloved by all about him, his servants never care for leaving him: by this means his domestics are all in years, and grown old with their master. You would take his valet de chambre for his brother; his butler is grey-headed; his groom is one of the gravest men that I have ever seen; and his coachman has the looks of a privy-councillor. You see the goodness of the master even in his old house-dog, and in a grey pad that is kept in the stable with great care and tenderness, out of regard to his past services, though he has been useless for several years.

"I could not but observe with a great deal of pleasure the joy that appeared in the countenances of these ancient domestics upon my friend's arrival at his country seat. Some of them could not refrain from tears at the sight of their old master; every one of them pressed forward to do something for him, and seemed discouraged if they were not employed. At the same time the good old knight, with a mixture of the father and the master of the family, tempered the inquiries after his own affairs with several kind questions relating to themselves. This humanity and goodnature engages everybody to him, so that when he is pleasant upon any of them, all his family are in good humour, and none so much as the person whom he diverts himself with: on the contrary, if he coughs, or betrays any infirmity of old age, it is easy for a stander-by to observe a secret concern in the looks of all his servants.

"My worthy friend has put me under the particular care of his butler, who is a very prudent man, and, as well as the rest of his fellow-servants, wonderfully desirous of pleasing me, because they have often heard their master talk of me as of his particular friend."

Such is the general outline of the character and position of Sir Roger de Coverley. In succeeding numbers we shall present his minuter features.

PORTABLE DIORAMA.—DISSOLVING VIEWS.

In a former number we gave an outline of the principles on which chiefly depend the effect produced at the Colosseum, the Cosmorama, the Panorama, the Diorama, and other similar exhibitions. Since then we have met with a suggestion by a Mr. Tait of Edinburgh, for the construction of a portable Diorama, which seems worthy of a few further observations.

Mr. Tait communicated to the Society of Arts of Scotland a description of a small apparatus by which the nature and effects of the diorama could be exhibited in an instructing manner. But to understand this, it is necessary to advert to Daguerre's account of

the mode of painting dioramic pictures, as divulged by him to the French government. A dioramic picture is painted on both sides. 'It is a large piece of lawn or calico, if possible without a seam, or at least with seams as little perceptible as may be necessary. The colours laid on the *front* of the picture are viewed by reflected light coming from a point above and between the spectator and the picture, while those laid on the *back* of the picture are viewed by transmitted light emanating from a window behind. In painting the front, the 'lights,' or white tints are left out, so as to admit the passage of light through the picture from behind: and even in the dark parts no body-colours are used, for though they would show well by reflected light they would appear as mere black irregular masses by transmitted light. While painting the front, the painter works by reflected light: but while painting the back, by transmitted light, because the effects intended to be produced can only thus be tested.'

Generally speaking, when a dioramic scene is represented by day, and then by evening or moonlight, the day effect is painted on the front of the picture, and the night effect on the back, and the admission of light is regulated according as the picture is to be viewed by reflected or transmitted light: in other words according as it is to be a *picture* or a *transparency*. But in other cases a subject more or less different from the first is represented on the back by which many of those startling effects have been produced which are so familiar to the visitors at the exhibition in the Regent's Park. The exhibition-room, be it large or small, is provided with shutters, by which the amount of light to be admitted can always be regulated, from broad daylight to total exclusion. If *fog* is to be represented, as it has been in many exhibited dioramas, the picture is placed at a greater or less distance behind a transparent screen, the greater the distance the more dim and foggy will the scene necessarily appear.

All these arrangements, in order to produce the desired effect to the eye of a spectator, must be so managed that the picture may be at a distance from the eye in a kind of room or recess, and it is probable that this circumstance led Mr. Tait to the suggestion of a portable diorama. The machine may be a small oblong box of any dimensions, to be viewed at one end. Small stretching frames are prepared, over which pieces of transparent paper or linen are stretched to form the pictures. Any one of these, when painted and about to be used, is inserted in a groove in the interior of the box, at a distance equal to two thirds of the length of the box from the end at which the eye is applied. The eye-hole is not simply a circular or square hole cut in the end of the box, but is a small tube two or three inches in length, placed opposite the 'point of sight' in the picture. The tube projects a little from the box, in order to assist the adjustment of the eye; and the inner end is expanded sufficiently to expose to view the whole of the picture in the box.

As a means of admitting light to act upon both sides of the picture at pleasure, two hinged covers are used, one at the top of the box, and the other at the end remote from the eye. Each cover, by a small pulley and balance weight, or any similar contrivance, is made to remain stationary in any required position. When the top cover is closed and the end one open, light falls on the back, but not on the front of the picture; and a person applying his eye at the tube would see the picture only by transmitted light. When the top cover is open and the ends are closed, the reverse of that occurs, and a spectator views the picture by reflected light. When any medium arrangement is adopted, such as one cover being open and the other partially closed, one closed and the other partially closed, or both partially closed, numerous variations of light and shade and tint in the picture are observed. Passing gleams of sunshine, day melting into night, and this into moonlight—and all similar changes, may be imitated with some approach to completeness.

The inside of the eye-tube, and everything which could distract the eye from the picture, is painted black, while the inner surfaces of the covers which may aid in reflecting light upon the picture are painted white. Screens of fine tissue-paper, Persian silk, or some other thin substance, are placed across the openings when the covers are raised, if a subdued light be required; and remarkable modifications of the effect may be produced by having these media coloured. The pictures may be viewed by the naked eye through the tube, or a lens might be employed to alter the effect.

It is not difficult to see that such a contrivance is an exact copy of the large diorama, in all its essential features. The construction of the box is a matter involving no great mechanical difficulties. The painting of the pictures is the feature which calls for most talent; for here attention must be paid to the different character or tone which reflected light and transmitted light throw over a picture, to the degree of opacity or transparency which different pigments will present, to the hues which natural scenery exhibits at different hours of the day, and to the character of the shadows produced by objects. The more carefully these matters are attended to, the better will be the miniature diorama.

There has been, within the last year or two, a kind of pictorial exhibition in London, called 'Dissolving Views.' These views are examples of a superior kind of phantasmagoric exhibition, or 'magic lantern,' in which striking effects are produced by simple but very ingenious means.

The phenomenon of a "dissolving" view consists in the adjustment of *two* views, or two lantern slides, in such a manner that one shall gradually disappear while the other comes in sight, the images of both occupying the same spot on the screen or wall. It is said that a German named Philipsthal, who introduced the phantasmagoria about sixty years ago, also gave the first rough idea of the 'dissolving views.' He was in the habit of representing, among other subjects, the raising of the ghost of Samuel by the Witch of Endor, in which he made the phantom appear to rise from the ground; but he conceived that if he employed two lanterns and slides, making the wick of one rise while he lowered that of the other; and directing both images to one spot, a more aerial and supernatural effect might be produced. This method succeeded, and Philipsthal was led to the adoption of similar arrangements for representing landscape scenery.

The improvements which have been made within the last few years have brought this plan to a point of great excellence. Two sliders or painted glasses are used, illuminated by one intense jet, having their devices represented on a screen, the localization to one spot being effected by optical means. While one picture is being exhibited, the other is hidden by a cover or shutter, and the effect of "dissolving," which is very remarkable, is produced by the gradual and simultaneous closing of one picture and opening of another. If, while one picture is being exhibited, the other is being changed for a third, and if while this third picture is under exhibition the second be exchanged for a fourth, and so on, an extensive series may be exhibited, each one apparently melting or dissolving into the succeeding one. This, like many other contrivances, appears simple enough when known; but the simplicity does not detract from the merit of the artists who contrived the arrangement.



[Common Bat (Vespertilio pipistrellus); Long-eared Bat (V. auritus); Great Bat (V. noctula).]

CURIOSITIES OF BRITISH NATURAL HISTORY.

BATS.

It may surprise some of our readers to be informed that sixteen or seventeen distinct species of bats are natives of the British Islands. Of these, however, several are extremely rare, and restricted to certain localities; but some, as the Pipistrelle or common bat, and the long-eared bat (*Vespertilio auritus*), are everywhere abundant; nor is the great bat (*V. Noctula*) of unfrequent occurrence.

Of all the mammalia the bats alone emulate in their aerial endowments the feathered tenants of the sky; they are essentially flying insectivora. In the air they pass the active periods of their existence, and revel in the exercise of their faculties. Their organs of flight, admirably adapted for their destined purpose, do not consist, as in the bird, of stiff feathers based upon the bones of the fore-arm, but of a membranous expansion stretched over and between the limbs, and to which the bones of the limbs, especially those of the elongated fingers, serve the same purpose as the strips of whalebone in an umbrella. This apparatus can be folded up, and the limbs employed in progression on the ground. On a level surface, however, the bat shuffles awkwardly but quickly along. In the hollows of decayed trees, in the crevices of mouldering masonry, or in rough chinks and fissures, it can crawl and climb about with tolerable rapidity, as also about the wire-work of a cage, a circumstance we have often witnessed. It is a smooth and level surface that most embarrasses the bat; but even then it can easily take wing. In the air the bat is all alertness:—it is here that these singular creatures pursue their insect prey—uttering their short, sharp cry as they wheel in circling flights, or perform their abrupt and zigzag evolutions. "Bats," says ——, "drink on the wing like swallows, by sipping the surface as they play over pools and streams. They love to frequent waters not only for the sake of drinking, but also on account of the insects which are found over them in the greatest plenty." Often during a warm summer evening have we seen numbers, perhaps several scores, of the common bat (*V. Pipistrellus*) flitting over a pool in chase of gnats and similar insects, or gambolling with each other in a mazy dance, ever and anon uttering sharp shrill cries of exultation and delight: an interesting spectacle to such as love to trace the woods and lawns and living stream at eve.

The bat is a twilight and nocturnal rambler: it passes the day in its retreat suspended head downwards, clinging to any roughness or projection by the claws of its hinder feet. In this position it hybernates in a state of lethargy, numbers congregating together. Church steeples, hollow trees, old barns, caverns, and similar retreats are its lurking places; and vast numbers are often found crowded closely together, and forming a compact mass. Pennant states that on one occasion, as he was informed by the Rev. Dr. Backhouse, one hundred and eighty-five were taken from under the eaves of Queen's College, Cambridge, and on the next night sixty-three more, all in a torpid condition. They were all of one species, viz. the Noctule, or great bat (*V. Noctula*), the largest of our British bats, measuring fourteen or fifteen inches in the extent of the wings. The great horse-shoe bat haunts the deepest recesses of caverns where no rays of light can enter. It is found in the caverns at Clifton and in Kent's Hole near Torquay, a dark and gloomy cavern, where the lesser horse-shoe bat also takes up its abode.

It has been suspected that some of our British bats may possibly migrate, and pass the winter, like the swallow, in some genial region where their insect prey is abundant. For this supposition there is not the slightest foundation: all our bats hybernate; but the period at which they become torpid in their retreats,

and revive to visit again 'the glimpses of the moon' differ in the different species. The Pipistrelle, or common British bat, is the soonest roused from its lethargic trance. It usually appears in March, and does not retire until the winter has decidedly set in, and its insect food has disappeared. Yet during the winter it will often rouse up and flit about, and that too during the middle of the day, as we have ourselves often witnessed. We have seen it abroad in November and December, though the weather was cold, and a friend shot one of these bats just before Christmas in the middle of the day, which, though the temperature was near or at the freezing-point, was clear and bright. The Noctule appears at the latter end of April, and seeks its winter dormitory in August. The long-eared bat (*Plecotus auritus*) is active in the early part of October.

The various species of our bats differ more or less distinctly from each other in the style and character of their flight. The Pipistrelle flits quickly, making abrupt and zigzag turns, and often skims near the ground; the Noctule, which was first noticed as an English bat by White, sweeps high in the air on powerful wings, whence he termed it *altivolans*. On one occasion we saw three or four of this species wheeling round a row of sycamore trees in Kent, uttering continually sharp grating cries. The chafer (*Melolontha vulgaris*) was at the same time flying in great numbers, and no doubt proved a source of attraction to them. The flight of the long-eared bat is rapid, and it makes large circles or courses to and fro like the swallow. In the actual evolutions of the bat the tail and membrane extending between the two hind limbs act as a rudder, enabling the animal to turn more or less abruptly. It would seem moreover that the tail is to a certain extent a prehensile organ. Mr. Bell, who first noticed the circumstance, observes that a small portion of the tail in most of our bats is exserted beyond the margin of the interfemoral membrane, and in ascending or descending any rough perpendicular surface this little caudal finger hooks upon such projections as occur, so as to add to the creature's security. When a bat traverses the wires of a cage this action of the tail is particularly conspicuous.

White observes that it is a common notion that bats will descend chimneys 'and gnaw men's bacon;' and adds that 'the story is by no means improbable, as a tame bat did not refuse raw flesh, though insects seemed to be most acceptable.' The common bat often enters larders, and has been seen clinging to a joint of meat in the act of making a hearty meal upon it. Of this circumstance we are assured by Mr. Bell.

That bats can be tamed is a remarkable fact, but various species differ in the degree of their docility. Mr. White's bat, a Pipistrelle, was so tame, that it would take flies out of a person's hand. "If you gave it anything to eat, it brought its wings round before the mouth, hovering and hiding its head in the manner of birds of prey when they feed. The adroitness it showed in shearing off the wings of the flies, which were always rejected, was worthy of observation, and pleased me much."

In the 'Proceedings of the Zoological Society' for 1834 we find the following interesting details relative to the habits of the Pipistrelle in captivity by Mr. G. Daniell. In July 1833 he received five specimens of this little bat from Elvetham, Hampshire, all were females and pregnant. 'They had been kept in a tin powder-canister for several days, and on being turned loose into a common packing-case, with a few strips of deal nailed over it to form a cage, they exhibited much activity, progressing rapidly along the bottom of the box, ascending the bars to the top, and then throwing themselves off as if endeavouring to fly. They ate flies when offered to them, seizing them with the greatest eagerness, and devouring them greedily, all of them congregating together at the end of the box at which they were fed, crawling over, snapping at, and biting each other, at the same time uttering a grating kind of squeak. Cooked meat was next presented to them and rejected, but raw beef was eaten by them with avidity, and with an evident preference for such pieces as had been moistened with water. This answered a double purpose: the weather being warm, numbers of blue-bottle flies (*Musca vomitoria*, Linn.) were attracted by the meat, and on approaching within range of the bats' wings were struck down by their action, the animal itself falling at the same moment with all its membranes expanded and cowering over the prostrate fly, with its head thrust under, in order to secure its prey. When the head was again drawn forth the membranes were immediately closed, and the fly was observed to be invariably taken by the head. Mastication appeared to be a laboured occupation, consisting of a succession of eager bites or snaps, the sucking process (if it may be so termed) by which the insect was drawn into the mouth being much assisted by the looseness of the lips. Several minutes were employed in devouring a large fly. In the first instance the flies were eaten entire, but Mr. Daniell afterwards observed detached wings in the bottom of the box. These, however, he never saw rejected, and he is inclined to think that they are generally swallowed. A slice of beef attached to the side of the box was found not only to save trouble in feeding, but also, by attracting the flies, afford good sport in observing the animals obtain their food by this new kind of bat-fowling. Their olfactory nerves appear to be very acutely sensible. When hanging by their posterior extremities and attached to one of the bars in front of the cage, a small piece of beef at a little distance from their noses would remain unnoticed, but when a fly was placed in the same situation they would instantly begin snapping at it. The beef they would eat when hungry, but they never refused a fly. In the daytime they often clustered together in a corner, but towards the evening they became very lively, and gave rapid utterance to their harsh grating notes. One of them died on the fifth day after they came into Mr. Daniell's possession, two on the fourteenth, the fourth survived until the eighteenth, and the fifth until the nineteenth day. Each was found to contain a single young one.' On the 16th of May 1834 the same gentleman procured five specimens of the Noctule bat, four females and a male. The latter, which died in two days, was very impatient of confinement, restless and savage, snapping at the females, and breaking his teeth in his attempts to escape by biting the wires of the cage. He constantly rejected food. The females were also at first sulky, but in about two days began to eat, preferring small bits of beef in preference to flies, beetles, or gentles. In the course of a few days three of these died, each found to be pregnant with a single offspring. The survivor lived for more than a month, and fed in preference upon the hearts and livers of fowls: she rejected large flies, but partially devoured one or two chafers (*Melolontha vulgaris*). In taking food it was remarked that the wings were not thrown forward as in the Pipistrelle, the food being seized with an action similar to that of a dog. The water that drained from the food was lapped, but the Noctule did not raise its head in drinking as the Pipistrelle was observed to do. This Noctule took great pains in cleansing herself: she used the hinder limbs as combs, parting the hair on either side from head to tail, and forming a straight line down the middle of the back. The membrane of the wings was cleaned by the creature's nose, which it forced through

the folds so as to expand them. During her captivity she brought forth a single offspring perfectly destitute of hair and blind: this she wrapped up so closely as to prevent any observation being made. In the evening of the day after giving birth to her offspring she died. But the young one was alive, and attached to the teat of the mother; whence it was removed, wrapped in warm flannel, and fed with milk, which it took from a sponge. It survived eight days, at which time its eyes had not opened, and it had acquired very little hair. The long-eared bat seems to be far more docile than the Noctule. In captivity this elegant species is confident and familiar, very careful in cleaning its fur, and enjoying to gambol and play with others of its species, pretending to bite as we see dogs do when in good-humoured sport. Mr. Bell informs us that Mr. James Sowerby possessed a long-eared bat, which when at liberty in the parlour would come to the hand of those who held a fly towards it, and take the insect without hesitation. "If the insect were held between the lips, the bat would then settle on its young patron's cheek, and take the fly with great gentleness from the mouth; and so far was this familiarity carried, that when either of my young friends made a humming noise with the mouth in imitation of an insect, the bat would search about the lips for the promised dainty."

The Barbastelle (*Vespertilio Barbastellus*, Linn.) is timid and restless, and very impatient of confinement. This bat seems to become torpid more readily than most of our British bats, and also more completely so. The reddish-grey bat (*Vespertilio Nattereri*) was found by Mr. Bell to be very familiar and confiding, readily taking food from the hand; while the whiskered bat (*V. mystacinus*) is timid and restless, and, refusing food, soon dies after its capture. The Barbastelle, the long-eared bat, and the two last mentioned, often hybernate in caverns. Mr. Bell's specimens were found with others in a large chalk cavern in Kent excavated at the bottom of a shaft seventy feet deep.

With regard to the senses possessed by these interesting animals, those of smell and hearing are, as might be expected from the development of their respective organs, wonderfully acute. Connected with the refinement of these senses, we often find, as in the horse-shoe bat, the nose furnished with a membranous foliation of most delicate structure and complex in its arrangement; or, as in the long-eared bat, the external membranous ears largely expanded, having furrows and an inner reduplication, and capable of being folded down. The sight also is quick, and the position of the eyes, which are small, but bright, is favourable for the chase and accurate seizure of insects during rapid flight.

There is a singular property with which the bat is endowed, too remarkable and curious to be passed altogether unnoticed. The wings of these creatures consist, as we have seen, of a delicate and nearly naked membrane of vast amplitude considering the size of the body; but besides this, the nose is in some furnished with a membranous foliation, and in others the external membranous ears are enormously developed. Now these membranous tissues have their sensibility so high, that something like a new sense thereby accrues, as if in aid of that of sight. The modified impressions which the air in quiescence, or in motion, however slight, communicates; the tremulous jar of its currents, its temperature, the indescribable condition of such portions of air as are in contact with different bodies, are all apparently appreciated by the bat. If the eyes of a bat be covered up, nay, if it be even cruelly deprived of sight, it will pursue its course about a room with a thousand obstacles in its way, avoiding them all, neither dashing against a wall nor flying foul of the smallest thing, but threading its way with the utmost precision and quickness, and passing adroitly through apertures, or the interspaces of threads placed purposely across the apartment. This endowment, which almost exceeds belief, has been abundantly demonstrated by the experiments of Spallanzani and others: it is the sense of touch refined to the highest and most exquisite degree of perfection. Thus are the bats aërial in feeling as in habits.

Full, then, of interest is the history of our British Bats, of which we have selected a few details. To watch their ways and actions, what time evening assumes "her gradual dusky veil," when the silence of the tranquil scene is unbroken, save by their sharp reiterated cry, the churr of the goatsucker, and drowsy hum of the shard-borne beetle, is alike pleasing to the contemplative man and the naturalist.

THE PRIVILEGES AND LIABILITIES OF BRITISH SHIPPING.

ACCUSTOMED as we are to the use of articles of foreign produce, and conscious as we may be of the vast maritime arrangements involved in the importation of such articles into England, there are yet probably few, unconnected commercially with the subject, who bestow much thought on the privileges conceded to English shipping, ship-owners, and commanders, in this respect. The tea, the sugar, the hemp, the timber, the wine, which find their way to England, must obviously do so in ships belonging either to British or to foreign ship-owners; and the determination of the ratio in which this freighting privilege shall be divided has led to laws and regulations which merit a little attention.

Mr. M'Culloch states that so long ago as the reign of Henry VII. a law existed whereby the importation of certain commodities was prohibited, unless imported in ships belonging to British owners and manned by British seamen. In the early part of the reign of Elizabeth foreign ships were excluded from our fisheries and coasting-trade. In the time of the Commonwealth foreign ships, belonging to whatever nation, were prohibited from trading with the plantations in America, without having previously obtained a licence. These however were minor regulations, quite eclipsed by a law passed in 1651, which gave a tinge to the maritime transactions of England from that time down to a comparatively recent period. England was at that period in bitter enmity with Holland, whose ship-owners were the great carriers for nearly all the nations of Europe; and it was to crush this power in a rival nation that the republican parliament passed the law in question. By the terms of this enactment, no goods or commodities whatever, grown, produced, or manufactured in Asia, Africa, or America, could be imported into England, Ireland, or the Colonies, except in ships belonging to English subjects, and of which the master and the greater number of the crew were also English. The import-trade of three out of the four quarters of the globe having been thus secured to the English ship-owners, the act proceeded to secure to them as much as possible of the European trade; and for this purpose it declared that no commodities of any European country should be imported into England, except by English ships, or by ships belonging to the countries where the exported goods were produced. This latter clause was intended expressly to act against the Dutch; for scarcely any of their produce came at that time to England, the merchant-ships of Holland having more frequently come to this country in the capacity of carriers for other countries. By the new law, any commodities imported from France, Spain, or Italy, for example, were to be brought either in English ships, or in French, Spanish,

or Italian ships, as the case might be; thus excluding the carrying ships of Holland.

Shortly afterwards the prohibition was relaxed to this extent: that while Russian and Turkish produce, as well as timber, grain, tar, hemp, flax, wine, spirits, sugar, and a few other articles, were to remain subject to the above regulations, all other commodities might be imported in any ships whatever. But this change was of little importance, for all the most important articles came under the "exceptions." In the reign of Charles II. the national animosity between England and Holland led to an enactment of extreme rigour, carrying the maritime exclusiveness to an extravagant extent; for it prohibited the importation from Holland, the Netherlands, and Germany, of a long list of commodities, under any circumstances, or in any vessels, whether British or foreign, under the penalty of seizure and confiscation of the ships and goods. This last-mentioned act was virtually one of exclusion rather than of commercial regulation; but it had for many years considerable influence on foreign ship-owners.

It was not until a very recent period (1833) that these laws were placed upon such a footing as to allow to foreign ships a privilege at all analogous to that enjoyed by English; and this change was only wrought when experience showed that other nations were about to retaliate. It may be flattering to the national vanity to know that British ships and British seamen are employed to bring foreign produce to our shore; but the maintenance of an analogous principle by other countries would be a perfectly just retaliation. The Americans in 1787, and the Northern powers of Europe at a later period, adopted, or proposed to adopt, measures avowedly copied from the navigation laws of England: so that if timely concessions had not been made, the English ship-owners would have severely suffered.

The regulations which came into force nine years ago, respecting the relative privileges of British and foreign shipping in importing foreign produce into England, involve the following as the chief points:—A list of what are called "enumerated articles" includes those which must be imported under one of these three circumstances: in British ships; in ships of the country where the goods were produced; or in ships of the country from whence the goods were shipped. This list includes masts, timber, boards, tar, tallow, hemp, flax, currants, raisins, figs, prunes, olive oil, corn or grain, wine, brandy, tobacco, wool, shumac, madder, madder-roots, barilla, brimstone, oak-bark, cork, oranges, lemon, linseed, rape-seed, and clover-seed. Goods which are the produce or growth or manufacture of Asia, Africa, or America, are not to be imported into England from any European country, with some few exceptions: this evidently has relation to the employment of English shipping, in preference to foreign European shipping, in bringing produce from distant countries to England. All goods imported from the Channel Islands must freight British ships only. All exports to our own colonies are to be in British ships; as likewise goods carried coastwise from one part of the British Islands to another, or from any one of our colonies to another. Lastly, any goods taken to one of our colonies in a foreign ship must be so taken only in a ship of the country where the goods were produced, or from whence they were exported.

As many advantages are thus given to English shipping over those of foreign countries, it may be asked how these British ships may be always able to designate themselves and to maintain their identity as such. This is effected by a remarkable system of *registration* maintained through the medium of the Custom-House officers. Vessels which are claimed by their owners to be placed on the registry, must be the property of the British sovereign's subjects, and must have been built in the British dominions or dependencies, or have been prize vessels legally condemned. The collectors and comptrollers of the Customs are generally the parties who register the shipping, and who grant certificates of registry to the owners. So severe are the laws in this respect, that if any ship were to exercise the privileges of a British ship before the owners have obtained a certificate of registry, the ship with the whole of its contents would become forfeited to the crown, and might be seized by the officers of the Customs. In order to reduce the immense mass of shipping within something like navigable order, every registered ship is supposed to "belong" to some particular British port, the Customs' officers of which grant the requisite certificate, and make the requisite entry in the register. The port to which a ship is said to belong is generally the nearest one to the residence of the chief owner of the vessel. The proprietorship of every ship, if there be more than one owner, is supposed to be divided into sixty-four equal parts or shares, which may be held by few or many shareholders, not exceeding thirty-two; and not only must every shareholder's name be entered on the certificate of registry, but if any transfer of shares should take place, the registry must be re-effected. No person, with some few exceptions, who has taken the oath of allegiance to a foreign power can become the owner of a British ship.

In order that the registry may be a *boná fide* one, it is necessary that the kind and quality of the ship be recorded; and in order to effect this, every ship is thoroughly examined and surveyed before registry by certain Customs' officers and shipwrights, to determine the tonnage and the general character of the ship. The ship is registered by a particular name, which is not to be afterwards changed. If the vessel after being registered undergoes any material alterations, it must be registered anew. If the vessel undergoes repairs in a foreign country exceeding the amount of 1*l.* per ton burden, it ceases to be a British ship, unless the owners or commander can show that such repairs were absolutely necessary at the time for the safe completion of the voyage.

It will thus be perceived that a great many conditions must be fulfilled before a vessel can rank as a British ship, and share in the privileges granted to British shipping. But besides the vessel itself, there are other matters to be attended to before a ship can engage in commerce as a British ship. For instance, every such ship must be navigated during the whole of every voyage, whether with a cargo or in ballast, in every part of the world, by a master who is a British subject, and by a crew of which three-fourths at least are British seamen. If the ship is employed in the coasting trade or in fishing on the British coasts, the whole of the crew must be British seamen. If on any occasion a registered ship is navigated by more than the prescribed number of foreign seamen, a penalty of 10*l.* for each one in excess is incurred.

These regulations render necessary a determination of the question, not only what constitutes a British ship, but who are British seamen? A British seaman, in the legal acceptation of the term, must be a natural-born subject of the British sovereign, or must have been naturalized by act of parliament, or must have been made a denizen, or have become a British subject by the conquest or cession of some newly-acquired territory, or (being a foreigner) must have served on board an English ship of war, in time of war, for the space of three years. Any of these may obtain the privileges, such as they are, of British seamen, and are

protected by certain laws respecting hiring, payment of wages, and the conduct of their officers.

A committee of the House of Commons, appointed in 1836 to inquire into the causes of the numerous shipwrecks which occurred about that time, suggested, in reference to the registration of ships and seamen, that a 'Mercantile Marine Board,' appointed for the control of merchant-ships generally, should perfect "a system of classification of ships, to the utmost attainable point of accurately defining, by such classification, the real state and condition of every ship registered;"—should "collect information as to the best materials for building, surveying, fitting-out, equipping, loading, and furnishing with the requisite supply of men, provisions, water, and boats, all ships built and registered in the United Kingdom;"—should form certain standards of qualification in seamanship, navigation, and nautical astronomy, to be attained by officers and masters before receiving licences of appointment in the merchant-service;—and should form registry-offices for recording the name, age, capacity, and character of British merchant-seamen, with a view to advance the praiseworthy and set aside the unfitting. These recommendations have not yet been acted on. Meanwhile the "underwriters," or insurers of ships, have adopted a system of registration for their own purposes well worthy of our notice in a future article.

Usefulness of Moles.—Our Correspondent, whose communication on the utility of moles in destroying the wire-worm and other grubs which feed on the plants of the young corn will be found in No. 618, has furnished the following additional information on this subject:—"I had," he says, "a small field of rye-grass and clover, one end of which, early in the spring, was like a honeycomb from workings of moles. A farmer would have destroyed the workers; I, on the contrary, protected them, and not one was destroyed: but I took care to level the mould which they threw up almost every day; and now to the practical result. I lately cut my crop, which was a very good one generally; but at the end, where the moles worked, the crop was better than in any other part; and now not a mole can be discovered in the field. They did the work designed to them by a wise Providence—ate up all the grubs which would have destroyed my young plants, and then took their departure to some neighbour's field, where doubtless they will be trapped. Another remark as regards birds: for example, as to those small birds which are seen upon fruit-trees, such as the titmouse: the vulgar opinion is that they destroy the buds, and thus injure or ruin the crop. Now I never suffer one of that kind of birds to be killed, but rejoice to see them, and protect them; and I would rather see a superabundance of sparrows than none at all, even by way of profit; and the consequence is, that I have very frequently had a crop of fruit when my neighbours have had none. Again, as you pass cottage-gardens, you very frequently see the leaves eaten off the cabbages and gooseberry and currant bushes growing near the doors by caterpillars; whilst cabbages in the fields and fruit-trees at a distance from houses are flourishing and left untouched. Here again the same cause is in operation; the small birds, which would have destroyed the insects, are driven from the doors, but perform their natural operations at a distance from them."

Autumnal Travelling in Siberia.—We made our first journey *en traineau* here; and bad enough it was in that way—on wheels it would have been impossible. The road was very mountainous, and lay through forests for eight or ten versts together, where the snow was drifted to the height of many feet; through which we had to force our way, it not being yet sufficiently hard to resist the horses' feet. In the rapid descents we constantly rolled over and over; and three horses to a light *traineau* had the greatest difficulty in getting up the long steep hills of snow, where there was no solid footing for them. What we should have done with our carriage on such roads we know not; and we had still a long journey before us before we should come to any town where we could leave it till our return from the far East, and to take it on the whole way was out of the question. The next day a council of war was held; when it was decided we should go on to Barnaoul on wheels, a distance of two hundred and eighty versts: but the road was represented as good, and we were told we should find much snow, it being mostly over a dead flat. Accordingly the carriage was fortified with very strong ashen shafts, which were fixed all round it, so as to force a passage through the snow in the case of need; and thus we started for Barnaoul. Bad as our journey had been for some time past, it was evident we had not reached the maximum, and that every day the roads would be worse, till the snow had settled down into solidity, which, in parts where there is little communication, requires some time. We had generally ten or twelve horses the whole of this journey, and did not with all average above five versts an hour. Our first stage was mountainous; but after that the steppes began again, with driving snow and wind almost amounting to what is called in this country a *buran*, or whirlwind, which is often fatal to travellers if accompanied with snow in any quantity. Having tried the effects of fire, water, and air, under their most fearful forms, we are inclined to give the pre eminence in point of horror to the latter. A *buran* which overtakes you in a forest is less formidable, because you cannot well get out of the right track, and the only danger is being buried alive in the snow. But in an open steppe country, when it is very violent, the snow which is falling becomes whirled round, and mixed with that which the wind raises from the ground; so that in broad daylight the driver cannot see an inch before him, and does not know whether he is going to the right or to the left. Many fatal accidents occur in this way; carriages being rolled down precipices, or men and horses frozen to death in the drifted snow, which naturally collects round the only object which interrupts its course for miles and miles.—*Cottrell's Recollections of Siberia.*

Importance of Cities.—If the history of cities and of their influence on their respective territories be deducted from the history of humanity, the narrative remaining would be, as we suspect, of no very attractive description. In such case, the kind of picture which human society must everywhere have presented would be such as we see in the condition, from the earliest time, of the wandering hordes of Mongolians and Tartars, spread over the vast flats of Central Asia. In those regions scarcely anything has been "made" by man. But this most happy circumstance, as it seems to be accounted—this total absence of anything reminding you of human skill and industry—has never been found to realize our poetic ideas of pastoral beauty and innocence. It has called forth enough of the squalid and of the ferocious, but little of the refined, the powerful, or the generous. If anything be certain, it would seem to be certain that man is constituted to realize his destiny from his association with man, more than from any contact with places. The great agency in calling forth his capabilities, whether for good or for evil, is that of his fellows. The picturesque, accordingly, may be with the country, but the intellectual, speaking generally, must be with the town. Agriculture may possess its science, and the farmer, as well as the landowner, may not be devoid of intelligence; but in such connexions, the science and intelligence, in common with the nourishment of the soil, must be derived, in the main, from the studies prosecuted in cities, and from the wealth realized in the traffic of cities. If pasturage is followed by tillage, and if tillage is made to partake of the nature of a study and a science, these signs of improvement are peculiar to lands in which cities make their appearance, and they become progressive only as cities become opulent and powerful.—*Dr. Vaughan's Age of Cities.*

Fossil Trees.—During the progress of the works for reclaiming the extensive waste called White Moss, between Middleton and Failsworth, a large number of trees, of enormous magnitude, have been discovered at a depth of about six feet; some of the oaks have been nearly twelve feet in girth and forty feet in length. Several trees of the oak, fir, and yew tribe have been found to be thoroughly sound, even to the outermost part. Many of the oak-trees have proved more tough and flexible than this tree is under ordinary circumstances. A large quantity of the timber has most unquestionably been on fire. It seems that during some remote age the fossil-trees at White Moss have been burnt, for there are examples of the main shaft of these timbers having been consumed. Singular as it may appear, the trees found in this moss have invariably been met with lying in a direction either south-east or due east.



[Chandalas.—From 'Les Hindoos' of Solvyn.]

THE CASTES AND TRIBES OF INDIA.

The institution of castes in India is one of the most curious chapters in the social history of mankind. The distinction of ranks and the separation of professions appear to have been established before the remotest era which Hindoo tradition reaches. According to their sacred books the Brahmen proceeded from the mouth of the Creator, which is the seat of wisdom; the Cshatriya from his arm; the Vaisya from his thigh; and the Sudra from his foot. These castes comprise the four orders of a primitive state of society. The Brahmen were priests, the Cshatriyas soldiers, the Vaisyas husbandmen, and the Sudras servants and labourers. The Hindoo religion teaches its followers that it would be impious to confound these different orders. This distinction of caste is the framework of Hindoo society, and all its inconveniences and palpable injustice have been submitted to for ages from a sense of religious duty. The punishment for crime varies in severity with the caste to which the offender belongs, and while the law is merciless towards the Sudra, its force is mitigated when persons of the three higher castes are brought within its reach. In other matters the abuse of natural rights is equally outrageous. For the interest of money on loan the Brahmen only pays two per cent., while three per cent. is exacted from the Cshatriya, four per cent. from the Vaisya, and five per cent. from the Sudra. Mill says:—"As much as the Brahmen is an object of veneration, so much is the Sudra an object of contempt and even of abhorrence to the other classes of his countrymen. The business of the Sudra is servile labour, and their degradation inhuman. Not only is the most abject and grovelling submission imposed upon them as a religious duty, but they are driven from their just and equal share in all the advantages of the social institution." He then cites passages from the sacred books which show that the Sudra was created for the purpose of serving Brahmens; that he was not permitted to accumulate personal property; and that a Brahmen must never read the Veda (the sacred scriptures of the Hindoos) in the presence of Sudras. In the new edition of Mill, by Horace Hayman Wilson, Esq., the Professor of Sanscrit at Oxford, there is the following important note on this passage. Professor Wilson says:—"The law does not justify the term 'abhorrence.' Mr. Mill has collected the extreme texts, and has passed over all the favourable or qualifying passages. The condition of a Sudra in the Hindu system was infinitely preferable to that of the helot, the slave, or the serfs of the Greek, the Roman, and the feudal systems. He was independent; his services were optional: they were not agricultural, but domestic and personal, and claimed adequate compensation. He had the power of accumulating wealth, or injunctions against his so doing would have been superfluous. He had the opportunity of rising to rank, for the Puranas record dynasties of Sudra kings, and even Manu notices their existence. He might study and

teach religious knowledge, and he might perform religious acts. No doubt the Sudra was considered in some degree the property of the Brahmen, but he had rights, and privileges, and freedom, much beyond any other of the servile classes of antiquity." Mr. Mill himself, in a note elsewhere, observes that "so inconsistent with the laws of human welfare are the institutions described in the ancient Hindu books, that they never *could* have been observed with any accuracy; and when we consider the powerful causes which have operated so long to draw, or rather to force the Hindoos from their inconvenient institutions and customs, the only source of wonder is, that the state of society which they now exhibit should hold so great a resemblance to that which is depicted in their books." In certain cases of necessity the three higher castes were permitted to have recourse for subsistence to the employments of the class or classes below them; but the Sudra, being the lowest, was confined to the species of labour assigned to him, and in seasons of public distress the competition of the Vaisya, or third class, might come to aggravate his previous misery. But, as Professor Wilson points out, he had a resort which the other castes were denied,—emigration; and subsequently the institution of mixed or impure castes threw open their avocations to him. Of these lower castes we must here give a brief notion.

The origin of mixed or impure castes is to be ascribed to the force of circumstances which laws could not prevent. Children were born whose parents belonged to different castes, and they in consequence belonged to no caste, and could not fall into any of the established employments. The infringement of the sacred laws to which they owed their birth rendered them inferior to the degraded Sudra. Charity or plunder could alone furnish them with the means of subsistence. When the number of these outcasts became so great as to render them dangerous to society, the Brahmen, by supernatural means, as the sacred books allege, created a sovereign endowed with the power of arresting the evils of this disordered state. He classified these outcasts, and assigned to each its particular occupation. Instead of plunderers, they became artisans, practised handicrafts, worked in metals, the subdivision of classes being equal to the number of additional occupations which the exigencies of society at the time demanded. This process, whenever it took place, marks the commencement of a new social era. The division of the older society into four classes, comprehending priests, soldiers, husbandmen, and servants, was too simple for a more advanced period. Thirty-six branches of the impure class are mentioned in the sacred books, but the number, as well as the avocation of each, is variously stated by different writers. The lowest caste of all is the offspring of a Sudra with a woman of the sacred caste. This tribe are called Chandalas. Carrying out the corpses of the dead, the execution of criminals, and other degrading and uncleanly employments, are performed by this caste. They are prohibited from living in towns, their very presence being regarded as a pollution; and on meeting a person of a higher caste they are compelled to turn aside lest he should consider himself contaminated by their approach; and yet, while this and other castes are submitting to these indignities and degradations, they are alive to the "pride" rather than to the "shame" of caste. Professor Wilson says:—"The lowest native is no outcast; he has an acknowledged place in society; he is the member of a class; and he is invariably more retentive of the distinction than those above him."

THE WALHALLA.

The 19th of October, 1842, was a memorable day for Bavaria and its king, for it was that on which was inaugurated a most noble structure, reared for a most noble purpose—to serve as a Pantheon consecrated to genius and intellect—to the heroes, the philosophers, and the poets of universal Germany. Had Ludwig of Bavaria accomplished nothing else, that single edifice would have amply sufficed for his fame, and would have placed his name by the side of those of Pericles and Hadrian, of Leo and the Medici. But when we also call to mind the numerous splendid structures with which he has graced Munich,* rendering it a sanctuary of art, and raising it from comparative obscurity to a very high rank among the capitals of Europe, and that within the short space of twenty years, we have cause to feel astonished; nor is our astonishment altogether unmixed with mortification when we look at home, and perceive that although several handsome buildings have been erected of late years, hardly any of them are of first-rate importance; while some which ought to have been treated as such, and which offered opportunities by far too valuable to be trifled with, have turned out more or less unsatisfactory. No doubt the new houses of parliament will make amends for preceding failures and mishaps in our national edifices, and amply console for them, if consolation it shall be to know that had they been conducted with the same judgment, ability, and zeal, many of our public buildings would have been very greatly superior to what they now are. However, instead of indulging in ungracious comments relative to architectural doings at home, let us proceed to notice what has been done abroad, namely, the Walhalla.

The site of the structure has already been shown in our 274th Number, where the view of it conveys more of an impression of its general effect in combination with the surrounding scenery than of the building, the latter being purposely thrown quite into the distance, so that no more than its general mass is discernible, for the exterior, having no claim to originality, did not call for any minuteness of detail. The structure stands on the north bank of the Danube, so that its principal front, with the flights of steps and terraces leading up to it, faces the south. It is not, however, the mere building or temple taken by itself, but the entire combination produced by the vast constructions on which it is raised that is so exceedingly striking and impressive, and is attended with peculiar grandeur; and had the same building stood upon a flat level, and risen immediately from the ground, the effect would have been altogether different from and inferior to what it now is, when it sits "throned" aloft. Hardly do we know any other edifice, ancient or modern, that has so magnificent an emplacement. Standing at the bottom of the first flight of steps, a person can see only the massive Cyclopean walls of the lower terrace; nor does he obtain a view of the portico until he has reached the steps leading immediately up to it; but when he does come in sight of it, it shows itself to all the greater advantage, bursting upon the eye in towering grandeur, after being lost to it during all the previous approach.

Of the Walhalla itself, the exterior, as we have said, has no pretensions whatever, nor does it affect any, to originality of design; it being in its architecture no more than a repetition of the Parthenon. But if, beautiful as it is, the exterior shows no invention on the part of the architect (Baron von Klenze), widely different is the case with regard to the interior, which

* For an account of some of the buildings, see *Munich*, 'Penny Cyclopædia.'

is not only most splendid in decoration, but perfectly novel, and as yet quite unique as regards the form of the roof, which corresponds with that of the external one, so that its ends are of pediment shape, and there are intermediate pediments over the horizontal beams resting on the massive piers which divide the plan into three compartments, each of which has a skylight of plate-glass. Thus, while the temple-like character of the exterior is perfectly kept up, and quite free from windows (except one at the north end, corresponding with the door at the other), the interior is lighted much more effectively than would have been the case had the side walls been pierced with such apertures.* Not the least recommendation of all attending the internal form of roof here introduced, is that, while it is altogether original, it is also perfectly consistent and characteristic, since it so completely accords with the outward shape that the spectator is forcibly reminded that the exterior has a pediment at each end. There is no masking—no incongruity—no contradiction of character. You do not find a vaulted Roman hall, within the shell of a Grecian Doric temple. On the other hand, no space is lost for the roof, as would have been had there been a flat coffered ceiling; consequently greater loftiness is obtained. In addition to these advantages, this roof promises the utmost durability, being constructed entirely of cast-iron, but has nevertheless been rendered of most magnificent character within the ceiling or inner surface, being covered with plates of gilt bronze. All the other decorations are of corresponding richness: the pavement is composed entirely of marble, laid in a pattern whose colours are black, white, yellow, and red. The same material of different sorts and hues is employed for the walls, antæ, and columns; nor is the gilding spared, or polychromic embellishment omitted. Corresponding with the richness of the materials employed is that of the design, and all the details. To attempt any description of the latter would be idle, and in regard to the former it must suffice to state that the interior consists of a beautiful Ionic order in columns, and in antæ at the angles of the piers between the compartments; and above that is another or Caryatic order, of colossal female figures representing *Valkyriæ*, or Genii of Walhalla.

In no one respect has cost been spared. The solidity of the construction is quite extraordinary, for not only is the whole entirely of marble, both within and without, but the walls are between eight and nine feet in thickness: it may therefore almost literally be said to be imperishable, calculated to endure for centuries of centuries, and to be a monument that will outlive all but the fame of the illustrious worthies whose busts are deposited within its sanctuary,—all but the fame of Ludwig of Bavaria, who needs no other monument to preserve his name.

A few matter-of-fact particulars may be subjoined, to state the principal dimensions, as given in Bavarian measure, which is something less than our own, the Bavarian foot being to the English one as 0·9517 to 1·000. Extreme length of the plan, including lower flight of steps, three hundred and seventy feet. Greatest breadth, or that of first terrace, two hundred and eighty-six feet. Height of first terrace, sixty-seven feet; height from the ground to level of portico, one hundred and thirty-eight feet; height to the apex of pediment, one hundred and ninety-five feet. Temple, measured at base of columns, ninety-eight by two hundred and seventy-five feet: interior, one hundred and fifty by fifty-seven feet; or total length, including the farther compartment at the north end, behind the screen of columns, one hundred and seventy-eight feet. Beneath the temple are massive substructures of vaulted chambers, entered from a door on the first terrace, and forming an ascending plane from that level.

* How few and comparatively small apertures are required for lighting an apartment, when they are made in the ceiling, instead of the sides, is strikingly manifested in the large room of the General Commercial Hall, Threadneedle Street, which is now beautifully lighted, although there would have been little more than darkness visible, had the apertures which are now skylights been made side-windows.

Pekin.—A Russian officer, M. Kovenko, has published in the 'Annuaire des Mines de Russie,' a sketch of environs of Pekin, some extracts from which may interest our readers at the present moment. For a century past, Russia has maintained a convent and school at Pekin, where her interpreters receive their education in Chinese and Mantchou. Every ten years the members of these two establishments are changed, and fresh monks and pupils are sent from St. Petersburg. During their stay at Pekin, the Russians are free to see all things and visit all places without awakening the restless jealousy of the government. Pekin, according to M. Kovenko, is situated in a plain bounded to the north-west by a series of mountains which the Chinese divide into northern and western, according to their position with reference to the city. The northern mountains are a day's journey from Pekin; that being no great distance, for the Chinese never travel more than five and twenty of our miles in a day. This road in summer is very picturesque, and the country highly cultivated. The yellow millet is the Chinese peasant's plant, *par excellence*. Its grain is the basis of his nutriment; the stalk is food for his cattle, in the place of hay, which they have never thought of cutting. The straw of another species of millet, which attains a height of fifteen feet, is used to make the fences of gardens, and serves also for fuel. Near these northern mountains are some springs, having a temperature of forty-five degrees. The water is conducted by pipes into baths cut in the calcareous rock, and lined with sheets of lead. Early in the spring crowds assemble at this spot in search of health or for the mere pleasures of the promenade. The Imperial family has a palace here, and there are several temples in the neighbourhood. In these temples it is that the weary traveller may seek repose; but the hospitality of the priests of Khé-san and of Da-o is by no means gratuitous. M. Kovenko asserts that a few hours' rest will cost about eighteen roubles (between 16*s.* and 17*s.*), and upwards of twenty-five roubles are often paid for a day's. A multitude of fruit-trees grow in the valleys of these mountains, as well as willows, firs, juniper-trees, and cypresses, but these do not form forests of any considerable extent. The western mountains are remarkable for the coal which they enclose. So abundant is it, that a space of half a league cannot be traversed without meeting with rich strata. Yet, either because of this very abundance, or from the inveterate habit which the Chinese have of leaving all things unperfected, the art of mining is yet in its infancy amongst them. Machinery to lighten labour is there unknown. They have not even an idea of the pumps indispensable to draw off the water. If local circumstances allow, they cut drainage-galleries; if not, they abandon the working when the inundation has gained too far upon them. Their system of ventilation consists in making openings at certain distances, over which they place wheels turned by men. But these wheels, though incessantly in motion, introduce very little air into the mines. The mattock, pick-axe, and hammer are the mining instruments. A furrow is traced with the pick-axe, the mattock is inserted and driven in with the hammer; and in this manner lumps of coal are detached, weighing from sixty to eighty pounds. Coal is at a moderate price in the capital. It is burnt in bronze vases, or its heat is distributed along the wall by means of pipes. These precautions against cold are very necessary at Pekin, and not the mere consequences of that strange habit which makes the Chinese heat all their drinks, even their wine. It freezes and snows often, and on the 31st of December, 1820, M. Timkowski found the thermometer there down to twelve degrees below zero.—*Athenæum.*



[Hatfield House.]

PROGRESSES OF QUEEN ELIZABETH.

FROM HATFIELD PREVIOUS TO HER CORONATION.

Among the many alterations which increased facility of intercommunication has produced, is one that may not perhaps at first occur to us—this is the lessening of processional pomp and magnificence. When the removal of a nobleman's or a gentleman's family from one of his residences to another involved the transport also of much of his household stuff, and when neither roads nor vehicles admitted of rapid movement, such removals were unfrequent, the train naturally assumed the processional form, the rarity gave it the character of a show, and the occasion, the farewell or the welcoming of the local chief, gave it that of a holiday. What arose from necessity became consecrated by custom, and ultimately elevated by art into a gorgeous though sometimes rude display of pomp. The rank and dignity of the individual were considered to be involved in the number and magnificence of his attendant retinue, and his popularity or political influence was indicated by the reception he met with in the places through which he passed. On the embassy of Becket to France in 1158, he was attended by two hundred knights, besides barons and nobles, a host of domestics, eight covered waggons, each guarded by armed men and a fierce dog, containing his kitchen and bedchamber furniture, that of his chapel, his plate, his wardrobe, in which he had twenty-four changes of apparel, his hawks, hounds, huntsmen, &c., with twelve sumpter horses, each ridden by a monkey; and two hundred and fifty boys, who preceded the train on enter[illegible] a town, singing national songs. In a later [illegible] magnificence of Wolsey was not less re[illegible], though the style was somewhat altered. At [illegible]sent time, when the queen and court travel by railroad at the rate of forty miles an hour, or in post-chariots at fifteen—when judges go their circuits by similar conveyances, nothing of the old custom remains to us, except the heavy pomp of funereal processions, and the scarcely less heavy and unpoetical exhibition offered to the citizens of London on Lord Mayor's day, or, occasionally, the less pompous but more impressive ceremony of the opening of parliament by the sovereign in person.

During a period when it was a work of great labour, requiring much time, and occasioning enormous expense for subjects, particularly those from the remoter districts, to visit the court and look upon their sovereign, it became a practice with all such monarchs as thought they deserved or wished to acquire popularity, to make Progresses through the different parts of their territories. As the necessities for the long and cumbrous trains became less imperative, efforts were made to give these exhibitions more of an ornamental and intellectual character, though frequently of a formal and pedantic description, on the part alike of visitors and visited. It was during the reigns of Queen Elizabeth and King James I. that these entertainments reached their highest elevation; and from that of the last we may date their extinction: so vain are the efforts of art to prolong the existence of any state of manners not in unison with the more material conveniences and improvements of the time. As a record, however, of a state of manners which can never return, and affording also occasion of exhibiting specimens of the current literature, we purpose giving a few papers upon the Progresses of Queen Elizabeth, abundant materials for which are found in the three bulky quartos under that title, published by the late John Nichols, Esq., though we shall not confine ourselves to this single authority.

The princess Elizabeth, as is generally known, passed the last part of the reign of Queen Mary in a sort of half confinement in the then royal palace of Hatfield, now the seat of the Marquis of Salisbury, to whose good taste the public are indebted for the preservation of the building in all its substantial features as it then existed. It was here that, on the 18th of November, 1558 (Queen Mary having died early in the morning of the 17th), several lords of the Privy Council waited on her to announce her accession to the throne. She remained here till the 23rd, when she began her first Progress, which we may say only terminated with her Coronation.

At her departure she was attended by more than a thousand persons. At Highgate she was met by the bishops, and at the foot of Highgate Hill by the lord mayor and corporation of London, by whom she was accompanied to the Charter-House, then the residence of Lord North. On the 28th she proceeded to the Tower. "All the streets she was to pass, even to the Tower, were new gravelled; and so she rid through Barbican and Cripplegate, and along London Wall unto Bishopsgate, and thence up to Leadenhall, and so through Grasschurch Street and Fanchurch Street, turning down Mark Lane into Tower Street, and so to the Tower." How pleasantly these "old familiar" names fall upon the ear, speaking of so little change, that they are yet the perfect direction of the road from the Charter-House to the Tower! "Before her rode many gentlemen, knights, and nobles: after them came the trumpeters blowing; then all the heralds in array; my lord mayor, holding the queen's sceptre, riding with garter; my lord of Pembroke bare the queen's sword. Then came her grace on horseback, apparelled in purple velvet, with a scarf about her neck, the serjeants-of-arms being about her person. Next after her rode Sir Robert Dudley (afterwards Earl of Leicester), master of her horse; and so the guard with halberds. There was great shooting of guns; the like was never heard before. In certain places stood children, who made speeches to her as she passed, and in other places was singing and playing with regals." At the Tower she remained till Dec. 5, on which day she went by water to Somerset Place, "trumpets sounding, much melody accompanying, and universal expressions of joy among the people." The ceremonies attendant on the funeral of Mary occupied a few days, and on the 23rd Elizabeth left Somerset House for her palace at Westminster, where she kept her Christmas. On Thursday, Jan. 12, 1558-9, she left Westminster, to go by water to the Tower, "the lord mayor and aldermen in their barge, and all the citizens, with their barges decked and trimmed with targets and banners of their mysteries, accordingly attending on her grace. The batchelor's barge of the lord mayor's company, to wit, the Mercers', had their barge with a foist trimmed with three tops, and artillery aboard, gallantly appointed to wait upon them, shooting off lustily as they wont, with great and pleasant melody of instruments, which played in most sweet and heavenly manner. Her grace shot the bridge about two of the clock in the afternoon, at the still of the ebb, the lord mayor and the rest following her barge, attending the same till her Majesty took land at the Privy Stairs of the Tower Wharf."

On the 14th commenced the grand display of her progress by land from the Tower to Westminster, previous to her coronation. A detailed description of this 'passage' exists in a curious tract, entitled 'The Passage of our most dread Sovereign Lady Queen Elizabeth through the City of London to Westminster the day before her Coronation,' anno 1558-9, published on the 23rd of the same month. In this it is stated that about two o'clock of the afternoon she "marched from the Tower to pass through the city of London towards Westminster, richly furnished and most honourably accompanied, as well with gentlemen, barons, and other the nobility of the realm, as also with a notable train of goodly and beautiful ladies, richly appointed; and entering the city, was of the people received marvellous entirely, as appeared by the assembly, prayers, wishes, welcomings, cries, tender words, and all other signs, which argue a wonderful earnest love of most obedient subjects towards their sovereign; and on the other side her grace, by holding up her hands and merry countenance to such as stood far off, and most tender and gentle language to those that stood near to her grace, did declare herself no less thankfully to receive her people's good will than they lovingly offered it unto her. To all that wished her grace well she gave hearty thanks, and to such as asked God to save her grace, she said again God save them all, and she thanked them with all her heart; so that on either side there was nothing but gladness, nothing but prayer, nothing but comfort. The Queen's majesty rejoiced marvellously to see that so exceedingly showed towards her grace which all good princes have ever desired; I mean, so earnest love of subjects, so evidently declared even to her grace's own person, being carried in the midst of them. The people again were wonderfully ravished with the loving answers and gestures of their princess, like to which they had before tried at her first coming to the Tower from Hatfield. This her grace's loving behaviour preconceived in the people's heads, upon these considerations, was then thoroughly confirmed, and indeed implanted a wonderful hope in them touching her worthy government in the rest of her reign. For in all her passage she did not only show her most gracious love toward the people in general, but also privately, if the baser personages had offered her grace any flowers or such like as a signification of their good will, or moved to her any suit, she most gently, to the common rejoicing of all lookers on and private comfort of the party, staid her chariot and heard their requests.

* * * *

"Near unto Fanchurch was erected a scaffold richly furnished, whereon stood a noise of instruments,* and a child in costly apparel, which was appointed to welcome the Queen's majesty in the whole city's behalf. Against which place, when her grace came, of her own will she commanded the chariot to be stopped, and that the noise might be appeased until the child had uttered his welcoming oration, which he spoke in English metre, as here followeth:—

"Oh! peerless sovereign Queen, behold what this thy town
Hath thee presented with, at thy first entrance here;
Behold with how rich hope she leadeth thee to thy crown,
Behold with what two gifts she comforteth thy cheer!

The first is blessings' tongues, which many a welcome say,
Which pray thou mayst do well, which praise thee to the sky;
Which wish to thee long life, which bless this happy day,
Which to thy kingdom heaps all that in tongues can lie.

The second is true hearts, which love thee from their roots,
Whose suit is triumph now, and ruleth all the game:
Whose faithfulness have won, and all untruth driven out;
Which skip for joy when as they hear thy happy name.

Welcome therefore, O Queen, as much as heart can think,
Welcome again, O Queen, as much as tongue can tell;
Welcome to joyous tongues, and hearts that will not shrink:
God thee preserve, we pray, and wish thee ever well.

"At which words of the last line the whole people gave a great shout, wishing with one assent, as the child had said. And the Queen's majesty thanked most heartily both the city for this her gentle receiving at the first, and also the people for confirming the same.

* A *noise* is a band—a noise of music, a band of music.

Here was noted in the Queen's countenance, during the time the child spake, besides a perpetual attentiveness in her face, a marvellous change in look, as the child's words touched either her person or the people's tongues or hearts. So that she, with rejoicing visage, did evidently declare that the words took no less place in her mind, than they were most heartily pronounced by the child, as from all the hearts of her most hearty citizens."

As well as being spoken, copies of all the addresses were stuck up in convenient places, in Latin as well as English. In Gracechurch Street, opposite the "sign of the Eagle," a "gorgeous and sumptuous ark" was erected across the street, elevated in three stages above the three arches, which gave a passage to the procession and its spectators. In the lowest stage, upon one throne sat richly dressed representatives of Henry VII. and Elizabeth, the one enclosed in a red rose, the other in a white rose, and both royally crowned, with their hands joined. From the two roses sprang two branches uniting into one, toward the second stage, and in this was placed a figure of Henry VIII., crowned, and seated by the side of Queen Anne Boleyn. From their seat ascended one branch to the highest stage, in which was a figure of Elizabeth herself. All the figures were represented by children, and in front was a standing for one, whose task it was to declare in verse the "whole meaning of the said pageant," the blessings of unity and the cessation of civil wars, to her majesty, with which she declared herself well pleased.

"Ere the Queen's majesty came within hearing of this pageant, she sent certain [persons], as also at all the other pageants, to require the people to be silent, for her Majesty was disposed to hear all that should be said unto her." A curious specimen of the orderliness of the populace, if the desire was complied with. On advancing through Cornhill, the Conduit "was curiously trimmed against that time with rich banners adorned, and a noise of loud instruments on the top thereof." The second pageant, at the "nether end of Cornhill," had for its title "The Seat of Worthy Governance;" children here again representing the characters of the Queen with four allegorical attendants, "Pure Religion, Love of Subjects, Wisdom, and Justice; which did tread their contrary vices under their feet; that is, to wit, Pure Religion did tread upon Superstition and Ignorance; Love of Subjects did tread upon Rebellion and Insolence; Wisdom did tread upon Folly and Vain Glory; Justice did tread upon Adulation and Bribery." Each was distinctively marked, not only by "their names set in plain and perfect writing on their breasts," but by their apparel; and one child was appointed to deliver the versified rather than poetical explanation. The Queen on all these occasions stayed her chariot, most attentively listened to the addresses, and thanked the city in appropriate terms for their pains.

"The Great Conduit in Cheap was also ornamented; and against Soper's Lane was another pageant of eight children representing the Eight Beatitudes, who also delivered an address; but the most marked one was that at the Little Conduit in Cheap, where the acceptance by the Queen of the Bible, and the promise oftentimes to read it, must have been highly satisfactory to the spectators in the then state of religious feeling in the city.

"Soon after that her grace passed the Cross she had espied the pageant erected at the Little Conduit in Cheap, and incontinent required to know what it might signify. And it was told her grace that there was placed Time. 'Time!' quoth she, 'and Time hath brought me hither.' And so forth the whole matter was opened to her grace, as hereafter shall be declared in the description of the pageant. But in the opening, when her grace understood that the Bible in English should be delivered unto her by Truth, which was therein represented by a child, she thanked the City for that gift, and said that she would oftentimes read over that book, commanding Sir John Parrat, one of the knights which held up her canopy, to go before and to receive the book. But learning that it should be delivered unto her grace down by a silken lace, she caused him to stay, and so passed forward till she came against the aldermen in the high end of Cheap before the Little Conduit, where the companies of the City ended which began at Fanchurch and stood along the streets, one by another, enclosed with rails hanged with cloth, and themselves well apparelled with many rich furs, and their livery-hoods upon their shoulders, in comely and seemly manner, having before them sundry persons well apparelled in silks and chains of gold, as whifflers and guarders of the said companies, besides a number of rich hangings, as well of tapestry, arras, cloths of gold, silver, velvet, damask, satin, and other silks plentifully hanged all the way as the Queen's highness passed from the Tower through the City. Out at the windows and the penthouses of every house did hang a number of rich and costly banners and streamers till her grace came to the upper end of Cheap. And there, by appointment, the Right Worshipful Master Ranulph Cholmely, Recorder of the City, presented to the Queen's majesty a purse of crimson satin, richly wrought with gold, wherein the City gave unto the Queen's majesty a thousand marks in gold, as Master Recorder did declare briefly unto the Queen's majesty. . . . The Queen's majesty, with both her hands, took the purse, and answered him again marvellous pithily.

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"And in the same pageant was advanced two hills, or mountains, of convenient height. The one of them, being on the north side of the same pageant, was made cragged, barren, and stony; in the which was erected one tree artificially made, all withered and dead, with branches accordingly. And under the same tree, at the foot thereof, sate one in homely and rude apparel, crookedly, and in a mourning manner, having over his head, in a table, written in Latin and English, his name, which was 'Ruinosa Respublica'—'A decayed Commonweal.' And upon the same withered tree were fixed certain tables, wherein were written proper sentences expressing the causes of the decay of 'Commonweal.' The other hill, on the south side, was made fair, fresh, green, and beautiful,—the ground thereof full of flowers and beauty; and on the same was erected also one tree very fresh and fair, and under the which stood upright one fresh personage, well apparelled and appointed, whose name also was written both in English and Latin, which was 'Respublica bene instituta'—'A flourishing Commonweal.' And upon the same trees also were fixed certain tables, containing sentences which expressed the causes of a flourishing commonweal. In the middle, between the said hills, was made artificially one hollow place or cave, with door and lock enclosed; out of which, a little before the Queen's highness coming thither, issued one personage whose name was Time, apparelled like an old man, with a scythe in his hand, having wings artificially made, leading a personage of lesser stature than himself, which was finely and well apparelled, all clad in white silk; and directly over her head was set her name and title, in Latin and English, 'Temporis filia'—'The daughter of Time.' Which two so appointed went forward toward the south side of the pageant. And on her breast was written her proper name, which was 'Veritas'—'Truth,' who held a book in her hand, upon the which was written 'Ver-

bum Veritatis'—the 'Word of Truth.' And out of the south side of the pageant was cast a standing for a child, which should interpret the said pageant," which was accordingly done in English and Latin.

The Queen, on receiving the book, kissed it, and laid it to her breast. At St. Paul's the scholars welcomed her with a Latin oration in prose, and some Latin verses, to which she listened attentively, and graciously received the written copies. At Ludgate the gate was decorated and a "noise of instruments" placed. At the conduit in Fleet Street was erected the fifth and last pageant, in which a "seemly and meet personage" represented "Deborah the judge and restorer of Israel," with six other personages, two denoting the nobility, two the clergy, and two the commonalty; while a child again addressed her in verses allusive to the pageant. At St. Dunstan's the "children of the hospital*" were drawn up, and one addressed her in a Latin oration. "From thence her grace came to Temple Bar, which was dressed finely with the two images of Gotmagot the Albion and Corineus the Briton, two giants big in stature, furnished accordingly; which held in their hands, even above the gate, a tablet, wherein was written, in Latin verses, the effect of all the pageants, which the City before had erected." In a smaller tablet was the same in English as follows:—

"Behold here in one view thou mayst see all that plain,
O Princess, to this thy people the only stay:
What each where thou hast seen in this wide town, again
This one arch whatsoever the rest contained doth say.

The first arch as true heir unto thy father dear,
Did set thee in the throne where thy grandfather sat;
The second did confirm thy seat as Princess here,
Virtues now bearing sway, and Vices beat down flat;

The third, if that thou would'st go on as thou began,
Declared thee to be blessed on every side;
The fourth did open Truth, and also taught thee when
The Commonweal stood well, and when it did thence slide;

The fifth as Deborah declared thee to be sent
From Heaven, a long comfort to us thy subjects all:
Therefore go on, O Queen, on whom our hope is bent,
And take with thee this wish of thy town as finall.

Live long, and as long reign, adorning thy countrie
With Virtues, and maintain thy people's hope of thee;
For thus, thus Heaven is won; thus must you pierce the sky:
This is by Virtue wrought, all other must needs die."

And so with a farewell address from a child on the south side "her grace departed forth through Temple Bar towards Westminster," with shouting and crying of the people, and the firing of the Tower ordnance.

* Christ Church.

INSURANCE OF SHIPPING.—"LLOYD'S LIST."

Many a newspaper reader has probably marvelled as to the nature and meaning of "Lloyd's Coffee-house." He may have seen, that in all lists or catalogues of shipping, entering or leaving foreign ports and harbours, Lloyd's agents or correspondents appear to furnish the information; and not unfrequently a letter appears from the Admiralty, giving information respecting lighthouses, beacons, and other matters pertaining to marine affairs, addressed to the Secretary at Lloyd's.

Who is this Lloyd? it may be asked, and what kind of a Coffee-house does he keep? And what has his Coffee-house to do with shipping affairs? And why does Lloyd employ so many agents and correspondents, and what advantage does he reap by so doing? The apparent incongruity of the matter may be cleared up at once by saying, that there is a Society or Committee of mercantile men, meeting occasionally for a defined object, who originally held their meetings in a subscription-room attached to a Coffee-house, at or near the Royal Exchange. "Lloyd's Coffee-house" hence became generally known in connection with the objects of that Committee; and in accordance with the brevity of commercial language, the simple word "Lloyd's" came to imply the Committee itself, and the general object for which it was formed; and the name has adhered to it ever since, though neither Lloyd nor the Coffee-house has had anything to do in the matter for some years.

The subscribers to Lloyd's are principally a number of persons known by the appellation of "Underwriters," who insure shipping on the same principle as a Fire-office insures buildings. But it is a remarkable feature, that these underwriters effect insurances individually, instead of combining their funds into a joint-stock for the purpose. The rooms which they engage (once at the Coffee-house over the Royal Exchange, from whence the system is named, and now, during the rebuilding of the Exchange, at the South Sea-house) serve as a kind of bazaar or general office, convenient for transacting business between the insurers and the insured.

To understand the origin of this system, we must look back to the last century. The present "Lloyd's Committee" arose out of the amalgamation of two societies, one of which had existed from 1760 to 1834; and the other from 1798 to 1834; the former a society of underwriters, and the latter a society of shipowners. The shipowners' society took cognizance of all matters relating to the general interests of shipowners; while the underwriters' society was established for the purpose of preparing and publishing annually a Register of British merchant shipping, in which the age, burden, limit, quality, and condition of vessels were so accurately entered, as in a great measure to guide the merchant, the shipowner, and the underwriter in their proceedings. About eight or nine years ago, circumstances occurred which led to a change in the system, by bringing merchants, shipowners, and underwriters all into one society, for the general benefit of all. Thus arose the present "Lloyd's" association, of which we will first describe the general constitution, and then the mode of working.

Lloyd's Register Society is composed of subscribers, of whom twenty-four are chosen to form a managing committee, viz. eight merchants, eight shipowners, and eight underwriters. Two of each class go out of office annually, and are replaced by others; and the election is so managed as to give shipowners and underwriters equal power in the Society. This Committee, as in analogous cases, has power to appoint the various servants of the Society, and to manage the general affairs.

The object of the society is based on the principle of assigning to merchant-ships, wheresoever built, or belonging to any one who may choose to co-operate with the society, a character that shall indicate as nearly as possible their real and intrinsic quality. The advantages are threefold. First, a merchant who freights a vessel with goods to a foreign country can form some opinion of the soundness of the vessel, if it occupies a place in Lloyd's Register; secondly, a person who is about to buy a ship, or a share in a ship, has something besides his own penetration to depend upon, when the ship is classed in the Register; and thirdly, an underwriter who insures a ship before it sets out on a voyage, can form a judgment as to the premium which he must charge, from the place which the ship occupies on the Register. The preparation of this Register thus becomes a matter of paramount importance, and engages the closest attention of the Committee. At one time the classification was effected on a very imperfect principle. Instead of classing the ships according to the actual state and condition ascer-

tained by a careful surveyor, the character of a ship was stamped wholly by her age and the place where she was built, without any regard to the manner in which she was constructed, the wear or damage she might have sustained, or the repairs she might from time to time have received. This had a lamentable influence on the mode of constructing shipping; for, to use the words of a Parliamentary Committee on the subject—"All new vessels, however slightly constructed, were entitled to be registered in the first class for a given number of years, varying from six to twelve, after which the strongest ships were placed on a level with the weakest, being excluded from the first class when the prescribed period of years had expired." Now, however, the classification is effected according to the actual merits of the ship. Surveyors are appointed by the committee at all the principal ports in the kingdom, to examine in the most scrupulous manner every ship which is to be placed on the Register. It is optional with a ship-owner whether he will or will not have his ship entered in this Register; but if he does, the surveyor examines it, and charges a certain fee for the registration. The surveyor at any particular port transmits periodically to London an account of all ships lost, broken up, or otherwise destroyed, belonging to his district; and also of all vessels building, the state of their progress, the changes which may have occurred in the ownership, and indeed every fact calculated to elucidate the actual state of the shipping at any given period. All the surveyors have been either practical nautical men or practical shipwrights, who have given up all other occupations to attend to the interests of Lloyd's Society.

It was stated in 1836 that out of twelve thousand British merchant-vessels above fifty tons burthen, seven thousand were entered in Lloyd's Register. All these entries were made in a book which is reprinted once a year. The fees for examining and classifying a ship vary from half a guinea to three guineas. When a surveyor has examined a new ship, he transmits to London full particulars of the examination, and mentions the class in which he thinks the ship ought to be placed in the Register. The Committee, if they think the reasons are good, assent to that recommendation; but if their inference from facts be different from his, they determine the class in which to place the ship. If a shipowner is so fortunate as to have his ship classed "A. 1," he seldom fails to append that character to the name of the ship in all his advertisements, as an honourable testimony to the character of the vessel.

Ships are seldom or never insured unless they are registered in Lloyd's list, for the underwriters and insurance societies have then no adequate means of knowing the character of the vessel. Nor can a shipowner sell a vessel so readily if it be not registered in the same list. Merchants, shipowners, and underwriters all feel confidence in this register, and hence its great importance.

There is a committee whose object is to superintend the preparation of the register above alluded to; and also another for the management of the underwriters' proceedings generally. Thus, agents are appointed in all the principal ports of the world, who transmit regularly accounts of the departures from and arrivals at their ports, as well as of losses and other casualties; and, in general, all such information as may be supposed of importance in guiding the judgments of the underwriters. There is an open subscription-room at "Lloyd's," in which all these items of information are entered in books, open to the perusal of the subscribers. It is from the register of shipping that the underwriter forms an opinion of the character of the vessels which he may insure; and from the daily list of occurrences at sea he learns the fate of these several vessels.

Some of the merchants and shipowners manage their own insurance transactions, that is, deal immediately with the underwriters; but there are others who employ insurance-brokers, paying a small per-centage for their services. The sum paid for insuring a given vessel at a given time depends on a large number of circumstances, such as the age of the vessel, its size and condition, the character of its captain or master for skill and steadiness, the nature of the cargo, the length of the voyage on which the vessel is destined, and the average amount of danger on that route. Nothing but the greatest experience can determine the probability of loss under these combined circumstances; but the effect of competition is to cause all these points to be thoroughly investigated.

Marine insurance is effected on three different systems; by individuals, by clubs, and by companies. The individual insurers are the underwriters of whom we have spoken, each of whom speculates on his own account. The clubs are associations of shipowners, who agree to divide among themselves the losses sustained in respect of any one of their ships. They enter their ships according to the estimated value, satisfactorily to all the members of the club; and in the event of any loss, the amount is collected individually from all the members, each paying a prescribed quota.

With respect to companies, none such were permitted by law to effect marine insurances until 1824, except two chartered companies; but since that period two others have been added. Mr. M'Culloch stated, in the second edition of his Dictionary, that about one-fifth of the marine insurance transactions is in the hands of the London companies, and four-fifths in the hands of underwriters and of country insurers.

In the policy of a marine insurance the general nature of the proposed voyage is set forth; and the insurance itself becomes void if the ship is lost or damaged under certain circumstances. Thus, acts of our own government, breaches of the revenue laws, breaches of the law of nations, deviations of route, protraction of the voyage,—all are, under certain restrictions, deemed to exonerate the underwriter or company from bearing the losses of a shipowner. The object in view is essentially to secure the shipowner from loss arising out of the "perils of the sea."

The Arein.—The Jaman is sometimes in the winter and spring a dangerous passage, as well on account of the depth of the snow, as in being subject to avalanches, and to the peculiar *tourmente*, as the mountaineers expressively term the snowy winds or windy snows, called the *arein*, a word which signifies in the patois of the country a sandy snow, the particles thereof being dry and brittle. These *areins* are formed by one layer of snow falling upon another, already frozen and hard, and a strong wind forcing its way between the two, slicing off, if I may be allowed so homely an expression, the latest fallen and uppermost, and driving it down the inclined and icy plain on which it has sought its short repose, with a fury that sweeps before it trees, châlets, herds, human beings, all in one bewildering, blinding hurricane, condemning the unfortunate passenger to certain death. In 1767 one of these *areins* swept away, between the Jaman and the village of Allières in Fribourg, on which we were now looking down in all the serenity of a summer's day, a number of large firs and several houses, which it carried to the verge of the precipices washed by the Hongrin in the Gruyères, sawing the cabaret of Allières literally in two, and carrying away the upper story, to the amazement of the inmates, who were thus ejected from the attics to the ground-floor without a moment's notice to quit. When any accident fatal to life occurs on the Jaman, it is forbidden to remove the body until the arrival of a magistrate, excepting the mother be present, in which case her sanction is deemed sufficient. The presence of the father is not considered equal authority. There is something very touching in this deference to maternal feeling.—*Mrs. Strutt's Domestic Residence in Switzerland.*



[Queenstown.—From a Drawing by Mrs. Simcoe, taken during the Revolutionary War.]

THE NIAGARA DISTRICT, WESTERN CANADA.—No. I.

Queenstown is situated on the Niagara River, or more properly Strait, about seven miles above the Falls, and six from the shores of Lake Ontario. There is a good and pleasant road parallel to the river from Fort Erie on the lake of the same name, through Queenstown, to Newark on Lake Ontario. The length of the Niagara Strait is thirty-five miles: by this outlet the waters of Lake Erie flow into Ontario, passing in their course over the tremendous cataract. A succession of severe actions between the Americans and the British took place in 1812, 1813, and 1814, on the banks of the Niagara; and one of the most desperate occurred within two miles of the Falls. The circumstances attending this contest were peculiarly calculated to show the hateful effects of war, as they aroused all those bad passions which seem tenfold more bitter in a border-warfare, when the ties of neighbourhood and kindred are disregarded, and their obligations violated. The militia on both sides being called out, neighbours were fighting against each other—a husband against the father of his wife, and against her brothers. Every town on the frontier was destroyed, either by one or other of the belligerent parties. In October, 1812, the American and British forces encountered each other at Queenstown, which was the scene of a sanguinary contest. The spot where the English general, Sir Isaac Brock, fell on this occasion is marked by a monument erected to his memory. It is one hundred and twenty-six feet high, and stands two hundred and seventy feet above the level of the Niagara stream, which runs just below it, so that it commands a noble view, thus described by Miss Martineau, in her 'Retrospect of Western Travel:'—"To the left a prodigious sweep of forest terminates in blue Canadian hills. On the right is the American shore. There stands the village of Lewiston (opposite Queenstown), with its winding descent to the ferry. At our feet lay Queenstown, its sordidness being lost in distance, and its long street presenting the appearance of an English village. The green river rushes between its lofty wooded banks, which suddenly widen at Queenstown, causing the waters to spread and relax their speed, while making their way with three or four bends to the lake. We saw the white church of Niagara, rising above the woods some miles off: and beyond, the vast lake, its waters grey on the horizon. There was life in this magnificent scene. The ferry-boat was buffeted by the waves; groups were in waiting on either side the ferry; and teams were in the fields." The portress was an active little Irishwoman, delighted to meet any one from the "old country;" and yet some short time before some travellers (English) had thrown down a telescope belonging to her from the top of the monument, and when she asked for payment received only abuse!

About half-way between the Falls and Queenstown there is a remarkable whirlpool, of which little notice is taken in the note-books of travellers, whose attention is too much occupied by the grandeur of the Falls. The whirlpool is most probably caused by extensive cavernous hollows in the rocky bed of the river in which the waters are partially engulfed. Millions of tons of water are precipitated over the Falls every hour, and yet here the Niagara is pent up within a narrow channel not exceeding one hundred yards in width. Mr. Buckingham mentions, in his recent work on the United States of America, that "so completely is the current carried round in the circular whirlings that water assumes in any vortex having a large outlet at its base, that trees, beams, and branches of wood are carried round and round for hours in succession in its centre, sometimes descending out of sight, and re-appearing again near the same place broken into fragments. It is compared by those who have seen both to the celebrated Maelstrom of Norway, but is on a smaller scale." In Cotton's 'Tour of the Lakes' there is a harrowing account of a boat having by accident come within range of the whirlpool, and an unfortunate person being hurried round the vortex many times before the final catastrophe, while his friends on shore could render him no assistance. In the 'Penny Magazine,' No. 147, an account will be found of a

similar accident which ended more fortunately. The Strait is so narrow at this point, that a stone has been thrown across from the American to the Canadian side, and a suspension-bridge has been projected as a means of communication between them. The rocky cliff on either side is about two hundred and fifty feet high, and the width less than that over which the bridges at Menai and Clifton are suspended. As it would overhang the whirlpool, it is thought that the cost would be reimbursed by the payments of persons visiting the spot. There is a railway from Lewiston to Buffalo.

Immediately after passing the elevated plateau of Queenstown Heights, the land shelves abruptly towards the shores of Lake Ontario, distant five or six miles, in a manner which at once arrests the attention of the geologist. The table-land, three hundred feet high, is broken by a precipice parallel to the lake. There is little doubt that this was once the boundary of its southern shore. Colonel Whittlesey, a scientific geologist and surveyor, who was officially appointed to examine this region, gives the following grounds for this supposition, which also account for the existence of the Falls. The table-land, it is to be observed, on both sides of the Niagara Strait, namely, at Queenstown and Lewiston, is level with Lake Erie. The line where it is abruptly broken is traceable for more than a hundred miles parallel with Lake Ontario, east of the Niagara, and Colonel Whittlesey thinks still farther, to the head of the St. Lawrence, at the Thousand Isles, or even to the Heights of Abraham at Quebec, and the Falls of Montmorency. "At this latter spot, and so on up the Thousand Isles above, some mighty rupture of the rocky beds beneath seems to have occurred by some convulsion of nature, and thus furnished a passage or drain for the Upper Lakes into the Atlantic. The time when this convulsion occurred must have been simultaneous with the production of the Falls of Niagara, which until then were a part of the shores of the two lakes, which here silently commingled their waters, until the sudden rupture and draining below threw the momentum of the mighty flood from the *now* table-land, and *then* lake-bed, at Queenstown, down the high precipice or naked shore, and thus excavated for itself the deep channel of Niagara river from this point to the diminished basin of Ontario. From Queenstown, the Falls, in course of time, by gradually, as they now hourly do, breaking off the shelving calcareous rock, worked their way naturally up to their present position, seven miles above, and will ultimately penetrate into Lake Erie; when another draining will take place, of Erie, Huron, and Michigan, both which latter are also doubtless diminished basins, up to the Sault St. Mary, or Low Falls, which divides these Lower Lakes from the great inland sea of Lake Superior. When that event occurs, another Niagara will in the same way be formed at this passage into Lake Superior. And so the mighty work will proceed, until our lakes, which none of them have great rivers of their own to supply the present constant draining of the St. Lawrence, and by evaporation, will shrink to minor pools, leaving, ultimately, their rich beds bare, to become the seats of civilization and of a vast population." Such are the speculations which a view of the neighbourhood of Queenstown suggests to the geologist and philosopher.

At the embouchure of the Niagara into Lake Ontario its breadth is about a quarter of a mile. The entrance is defended by two forts, one on the Canadian and the other on the American side. When Mrs. Jameson was in Canada, just before the last troubles, the British forces in the Canadian fort consisted of three privates and a corporal, with rusty firelocks and dismounted guns. She mistook the fort for a dilapidated brewery. This lady gives a very charming picture of the beauties of Ontario: "This beautiful Lake Ontario!" she exclaims,—"my lake—for I begin to be in love with it, and look on it as mine! It changed its hues every moment, the shades of purple and green fleeting over it, now dark, now lustrous, now pale—like a dolphin dying; or, to use a more exact though less poetical comparison, dappled, and varying like the back of a mackerel, with every now and then a streak of silver light dividing the shades of green: magnificent, tumultuous clouds came rolling round the horizon; and the little graceful schooners, falling into every beautiful attitude, and catching every variety of light and shade, came curtseying into the bay: and flights of wild geese, and great black loons were skimming, diving, sporting over the bosom of the lake; and beautiful little unknown birds, in gorgeous plumage of crimson and black, were fluttering about the garden: all life and light and beauty were abroad in the resurrection of Nature!" This was written when the long Canadian winter was just over.

THE FELLING AND TRANSPORT OF THE PINE AND FIR.

THE *pine* and the *fir* are among the most useful forest-trees which the world produces. There is scarcely a dwelling or a ship to be found in any part of Europe or America into the building of which one of these varieties of wood does not enter; and the juices or resinous products are particularly valuable in the arts of life. Many nations, too, procure edible substances from various parts of these trees. All the varieties of the pine and the fir genera belong to one botanical order, but without entering into a description of the trees themselves, or their relation to botany or agriculture, we may collect many instructive details respecting the geographical distribution of the pine and fir forests—the mode of felling and bringing to market—the economical uses of the timber, branches, bark, &c.—and the mode of obtaining the resinous products.

The forests of Norway and Sweden are among the most celebrated of the pine and fir kind, the Scotch pine and the spruce fir being the principal varieties. Dr. E. D. Clarke says, "If the reader will cast his eyes on the map of Sweden, and imagine the Gulf of Bothnia to be surrounded by one continuous unbroken forest, as ancient as the world, consisting principally of pine-trees, with a few mingling specimens of the birch and juniper, he will have a general and tolerably correct notion of the real appearance of the country." A common mode of transporting these trees from the forests where they are cut down, to the banks of streams or rivers, is to place them on wheel-axles, one vehicle to each tree, and then to draw them by horses guided by women. In every case a path or road is taken which will lead by the shortest route to a river—such a river, in Sweden, is the Gotha, which enables the rafts of timber to be floated down to the port of Gottenburgh. There are in Norway two rivers thus employed: one, the Glommu, which terminates at Christiania; and the other, the Drammen, which flows into the sea twenty miles westward of Christiania.

Nearly all the pine and fir timber grown in Russia, Prussia, and Poland is floated down the rivers which flow into the Baltic, generally adjacent to the ports of Memel, Dantzig, Riga, and St. Petersburg. The name of the port is often given to the kind of timber which is floated down to it: thus we hear of 'Riga timber' and 'Memel timber.' It is said that the timber shipped at Memel comes principally from the estates of Prince Radzivil, in Polish Prussia: it is more abundant than that shipped at any other of the Baltic ports; but its quality is inferior to that of Dantzig; while this latter, again, yields the palm of superiority

to the timber from Riga. This latter-named kind is largely used for the masts of English and French vessels; and in reference to it Mr. M'Culloch observes, "The mast-trade is very extensive. The burghers of Riga send persons, who are called 'mast-brokers,' into the provinces to mark the trees, which are purchased standing. They grow mostly in the districts which border on the Dnieper, and are sent up that river to a landing-place, whence they are transported thirty versts (about twenty-three miles) to the Dwina, where, being formed into rafts of from fifty to one hundred pieces each, they descend the stream to Riga. The tree which produces the longest masts is the Scotch pine. The pieces, which are from eighteen inches to twenty-five inches in diameter, are called 'masts;' and those under these dimensions 'spars,' or, in England, 'Norway masts,' because Norway exports no trees more than eighteen inches in diameter. Great skill is required in distinguishing those masts which are sound from those which are in the least degree internally decayed. They are usually from seventy feet to eighty feet in length."

Mr. Howison has given a very interesting account of the train of operations whereby Russian pine and fir are conveyed to St. Petersburg for shipment. As all the large timber near the capital has long since been cut down, the supply is obtained from a distance in the interior. A Russian proprietor wishing to dispose of the timber on his property, having completed a bargain with the St. Petersburg merchant, sets his peasantry to work in picking out, cutting down, and dragging the trees from the forests to the lakes and rivers. This work generally takes place during the winter months, in order that everything may be ready for floating the timber to St. Petersburg as soon as the ice on the rivers and lakes breaks up. As the ground is generally covered several feet deep with snow, and the trees judged to be sufficiently large and sound for the foreign market lie widely apart, the workmen and others employed in picking them out are compelled to wear snow shoes, to prevent them from sinking in the snow. When the trees are found, they are cut down with hatchets, and the head and branches lopped off. The trunk is then stripped of its bark, and a circular notch is cut round the narrow end of it, to facilitate the fixing of the rope by which the horses are to drag the trunk along; and a hole is made at the other end for a handspike, to steer the log over the many obstacles that lie in its way. Many of these trees are seventy feet in length, and of proportionate diameter; and they are drawn by from five to nine horses each, yoked in a straight line one before another, since the intricate narrow paths in the woods will not permit of their going in any other way. One man mounts upon the leading horse, and another upon the middle one, while others support and guide with handspikes the large and distant end of the tree, to raise it over the elevations of snow, and make it glide smoothly along. The conveyance of these large trees, the long line of horses, and the number of peasants accompanying them through the forests, present a very picturesque appearance. In many cases the trees are brought nearly a thousand miles before they are delivered to the merchant; and they generally remain under his care another winter, to be shaped and fitted for exportation in such a manner as to take up as little room as possible on shipboard; so that the Russian timber does not reach the foreign consumer till two years after it has been cut down. When the trees are delivered to the merchant, they are carefully examined to ascertain their soundness, and for this purpose a hatchet is struck several times against them, the emitted sound affording the means of estimating the soundness of the tree. Those which are defective, and which are called 'braake,' are about one-tenth of the whole. These trees are conveyed by horses, in the manner described above, only so far as is necessary to bring them to the margin of some of the lakes or streams which have water communication with St. Petersburg, floating being then the mode of transit adopted.

In the parts of Germany bordering on the Rhine, the timber is conveyed by the quickest route to that river, and then floated down in immense rafts, which have often been described by tourists. The author of 'An Autumn near the Rhine' says, "A little below Andernach the village of Namedy appears on the left bank under a wooded mountain. The Rhine here forms a little bay, where the pilots are accustomed to unite together the small rafts of timber floated down the tributary rivers into the Rhine, and to construct enormous floats, which are navigated to Dordrecht (Dort), and there sold. These machines have the appearance of floating villages, each composed of twelve or fifteen little wooden huts, on a large platform of oak and deal timber: they are frequently eight or nine hundred feet long, and sixty or seventy in breadth." This raft is composed of several layers of trees, placed one on another, and tied together, the raft drawing not less than six or seven feet of water. Several smaller rafts are attached to the large one, besides a string of boats loaded with anchors and cables, and used for the purposes of sounding the river and going on shore. The rowers and workmen sometimes amount to seven or eight hundred, superintended by pilots; and over the whole is a proprietor or manager, whose habitation is superior to the others. The "domestic economy" of the raft is very complete. Poultry, pigs, and other animals are to be found on board, and several butchers are attached to the suite. A well-supplied boiler is at work night and day in the kitchen. The dinner-hour is announced by a basket stuck on a pole, at which signal the pilot gives the word of command, and the workmen run from all quarters to receive their rations. The consumption of provisions during the voyage from Andernach to Dort is enormous, sometimes amounting to forty or fifty thousand pounds of bread, eighteen or twenty thousand pounds of fresh meat, with salt meat, butter, vegetables, and a host of *et ceteras*. A very large capital is necessary to undertake the formation of one of these rafts.

When we proceed southerly towards Switzerland, we find pine and fir forests elevated so much above the level of the rivers, as to give occasion for no small exercise of ingenuity in devising the means of transport. A remarkable instance of the plan, now frequently adopted, was afforded by M. Rupp about thirty years ago, in reference to the means of transporting the wood from the forests on Mount Pilate to the Lake of Lucerne. The mechanism has been so often described, that a slight notice will suffice here. In the year 1810 the price of Baltic timber was so high, that a hope was entertained of bringing into profitable sale the timber on this Swiss mountain, hitherto untouched on account of the difficulty of conveyance. M. Rupp conceived the idea of making an inclined plane which should extend the whole distance from the top of the mountain to the Lake of Lucerne, about eight miles. This inclined plane consisted of a trough, formed of twenty-five thousand pine-trees, six feet broad, and from three to six feet deep. To preserve a regular slope, it had to be conducted over the summits of rocks, along their sides, through tunnels, and over deep gorges, where it was sustained by scaffolding. The trough was kept constantly moist, and the trees descended along it into the lake with extraordinary rapidity. The larger pine-trunks, about a hundred feet in length, descended through the whole distance of eight miles in six minutes; a rapidity which pro-

duced an effect otherwise almost inconceivable to the view of a bystander. When the trunks arrived at the lake, they were floated down the Rhône to the sea. As the war, which occasioned the high price of Baltic timber, led to the construction of the Slide of Alpnach (as the contrivance was called), so did the return of peace restore the timber-trade to its old channel; and the Swiss project is understood not to have succeeded as a commercial speculation.

In many of the Alpine districts between Austria and Italy the difficulty of transporting timber to the level of the rivers has led to the construction of slides or troughs somewhat similar to that of Alpnach. In all such cases the slides are formed of several fir-trees placed side by side, and smoothed by being stripped of their bark: they are always made in such a direction as to maintain a pretty uniform slope. The slides are chiefly made use of in winter, at which time they are rendered more slippery by being wetted with water, which freezes immediately. A wood-cut and description of one of these Tyrolean districts have been given in No. 532.

In Scotland, one of the principal pine-forests is said to be that of Rothiemurchus, which spreads over the glens and valleys of the Grampian Hills. The timber from this forest is generally floated down the river Spey; and when, from a long season of drought, or any other cause, there is any difficulty in getting it down to the river, the workmen collect the trees into a suitable dell, and having built up a temporary dam, they wait the coming of a flood, which in a country of such varied surface is no rare occurrence. As soon as the temporary dam is full of water, they break down the boundary, and the liberated waters, bursting from their confinement, carry the trees with them impetuously down the Spey.

Every one who has heard of Canada and the United States must be aware that the pine and fir forests cover a vast area of the new continent. Among the remarkable features of Canada, the 'lumbering-parties' are not the least picturesque. These are clubs or bands of men who form a kind of 'joint-stock tree-cutting company,' and undergo no few hardships in the course of their labours. The proceedings of these lumbering-parties have been fully described by an eye-witness, in our No. 352.



[Etruscan Vase.]

ETRUSCAN ANTIQUITIES AT THE BRITISH MUSEUM.

THERE perhaps is not any department of the British Museum devoted to antiquities which, to those who know comparatively little of ancient history, excites so much interest as the Egyptian room. The most unlearned will survey attentively the intelligible memorials of manners and customs which, though so ancient, exhibit feelings and passions essential to man's nature in every age. The ornaments worn three thousand years ago gratified the same feelings then as they do now. The insight obtained into the domestic life of so remote a period shows only different modes of subserving the same ends amongst a people who made the greatest advance in early civilization. The Museum catalogue affords full explanation of the various objects presented to the eyes of the visitor. In passing through a room nearly empty, we enter another apartment, the objects in which are not yet perfectly arranged, nor are they described in the catalogue. These are the Etruscan antiquities. They do not at once claim the

visitor's attention so strongly as the memorials of ancient Egypt, but still we may read in them passages in the history of a people, and learn something of their domestic life, public ceremonies, and religious institutions. We know little besides what these vases tell us of a people who existed in Italy prior to the Romans, and who gave a deep and lasting impression to the religion and institutions of Rome. The language of the Etrurians is forgotten, the site of many of their cities is a matter of dispute; and had it not been for the great veneration in which they held their dead, and the arrangements which they made for their sepulture, we should have been unable to follow them to the remote times in which they existed as a flourishing people, evincing a taste, refinement, and magnificence in the arts and in their public ceremonials, which we can scarcely believe of a nation whose history is otherwise so obscure. They excelled in various arts, but they are universally known for their works in baked clay.

Several centuries before the building of Rome, which occurred about two thousand six hundred years ago, the Etrurians were settled in Italy on both sides of the Apennines. Etruria Proper is now the present Tuscany, with the addition of that part of the Papal States which lies on the banks of the Tiber. The Etruscan towns formed independent communities, governed by an aristocracy, the 'people,' who were probably a conquered race, being in a state of serfdom. The Etruscan settlements in Italy were established probably about three thousand or three thousand two hundred years since: and their existence as a nation was destroyed by the Romans after it had lasted eight or ten centuries. Their lands were given to the military colonies of Rome. The Etruscan language gradually became obliterated, except among the priests; and soon after the establishment of Christianity it became finally extinct. Niebuhr and all the best authorities agree that it is lost. Dr. Arnold, in his 'History of Rome,' in reference to the probability of a knowledge of it being restored, remarks that "the study and comparison of the several Indo-Germanic languages is making such progress, that if any fortunate discovery comes to aid it, we may hope to see the mystery of the Etruscan inscriptions at length unravelled." In the meantime we must be content with the pictorial language of the vases found in the tombs. These vases belong to three different periods of art, each exhibiting its peculiar style. The most ancient are those which resemble the Egyptian style; and it has been asserted that they were imported from Egypt, but they were most probably of native manufacture from Egyptian copies: harpies, sphynxes, griffins, &c. are figured upon them. They are party-coloured of red and black upon a pale yellow ground. The next in order are those with black figures on a red ground, in stiff and ungraceful outline, while the form of the vase itself is often very elegant. The most modern have red figures. The form of the vase is still more elegant, and often exquisitely beautiful, and the figures are graceful and spirited. They represent stories of gods and heroes, as well as incidents of domestic life. It has been said that the vases of this style were imported from Greece; but, on the other hand, the more probable history of the manufacture is that it was first brought from Egypt into Etruria, and was there carried to very high perfection, as shown in the black figured vases; and that it was afterwards further improved by Greek artists who settled in Etruria.

Mrs. Hamilton Gray, who is an enlightened enthusiast on the subject of Etruscan antiquities—of which she has formed a valuable collection at Bolsover Castle, containing several unique articles—remarks, in her 'Sepulchres of Etruria,' that "you will rarely see a black figure easy, natural, or graceful, however exquisite may be the beauty of its workmanship; and you will seldom be able to trace in a red figure that peculiar stiff and rigid quaintness which is characteristic of the most ancient Etruscan art. Those black figures which have a sketchy and flowing ease are on vases of a very inferior material and execution, and belong to the period of the decay of art, like the roughly-drawn red figures which are so common." The most modern Etruscan vases are about two thousand years old. None have been found at Herculaneum or Pompeii, though they were made in the neighbourhood in the highest perfection; and vases of terra-cotta, not painted, exist in great number in these lava-covered cities. It is inferred from this circumstance that the peculiarities of the Etruscan art had been lost before these places were covered by the eruption of Vesuvius in the first century.

Tarquinia, Veii, Vulci, Tuscania, and the other cities from whose necropoli the vases and other Etruscan remains have been collected, are in the neighbourhood of Civita Vecchia, and within a day's journey of Rome. The dealers in antiquities at Rome hire land where the burying-places were situated, and there carry on their excavations. The cemetery of an Etruscan city was as large as the city itself. Above two thousand tombs have been opened in that of Tarquinia, and it is computed to extend over sixteen square miles, and to contain not less than two million tombs; and yet it is surrounded on all sides by cemeteries of other cities of scarcely inferior extent. A common unpainted tomb consists of two vaulted chambers, small and low. On one side stands the sarcophagus, or bier, with its wreath, or arms, and around upon the walls are bronzes and terra-cotta. There are usually a number of vases on the ground near the sarcophagus. The subjects of the painted tombs are chariot-races, festivals, battles, in a spirited and lively-coloured style, "expressed," says Mrs. Hamilton Gray, "with a grouping and a spirit which is Greek, and a mannerism which is Egyptian." The lids of the coffins have, in some cases, figures of men and women in alto relievo, and in the coffins have been found a wreath of ivy, or of bay, in pure gold, or a helmet and spear; and in others something of gold or bronze, scarabæi, gems, jewellery; but rarely coins.



THE TRINITY HOUSE.

In our previous numbers we have given an account of the classification of the mercantile navy of Great Britain, and of the nature of the establishment known as "Lloyd's;" we now complete the subject by a description of the nature and duties of the corporation known as the Trinity House, to whose care are committed the lighthouses of Great Britain, the pilotage of the Thames, and other duties. The full title of the corporation is 'The Master, Wardens, and Assistants of the Guild, Fraternity, or Brotherhood of the Most Glorious and Undivided Trinity, and of Saint Clement, in the parish of Deptford Strond in the county of Kent'—an institution to whose members is intrusted the management of some of the most important interests of the seamen and shipping of England. Its duties and powers will best appear by a review of its history, and of the royal charters, grants, and several statutes under which the same exist. The earlier records, together with the house of the corporation, were destroyed by fire in 1714, so that the origin of the institution can only now be inferred from usage and the occasional mention of its purposes in documents of a later period. It seems however certain that the increase of shipping and the use of vessels of great burden having augmented the importance of a correct knowledge of the intricacies of the navigation of the channels leading into the river Thames and of the river itself, an association of seamen was formed for the purpose of forwarding and assisting the attainment of that object. It was material also that this knowledge should be solely possessed by British subjects; and probably this was present to the mind of Henry VII., who, when earl of Richmond, with a very inferior fleet, had crossed the English Channel from Harfleur, and effected a landing at Milford Haven, without molestation. That king bestowed great care upon the improvement of the navy, and it is presumed that with him originated the scheme, afterwards carried into effect by his son Henry VIII., of forming efficient Navy and Admiralty boards, which then first became a separate branch of public service. During the reign of Henry VIII. the arsenals at Woolwich and Deptford were founded; and we learn from Stowe that the Deptford-yard establishment was subsequently placed under the direction of the Trinity House, who likewise surveyed the navy provisions and stores. The earliest official document now extant is a charter of incorporation made by Henry VIII. in the 6th year of his reign. The first master acting under it was Sir Thomas Spert, commander of the famous ship called Henry Grace-à-Dieu, built by Henry VII. An exemplification of this charter was granted by George II. in the third year of his reign. By this charter the "shipmen and mariners are to establish a certain guild or perpetual fraternity;" and the brethren are empowered from time to time to elect one master, four wardens, and eight assistants, to govern and oversee the guild, and have the custody of the lands and possessions thereof, and have authority to admit natural-born subjects into the fraternity, and to communicate and conclude amongst themselves and with others upon the government of the guild and all articles concerning the science or art of mariners, and make laws, &c. for the increase and relief of the shipping, and punish those offending against such laws; collect penalties, arrest or distrain the persons or ships of offenders, according to the laws and customs of England or of the Court of Admiralty. The charter also grants to the corporation all liberties, franchises, and privileges which their predecessors the shipmen or mariners of England ever enjoyed.

It is supposed that prior to the incorporation by Henry VIII. there was a station belonging to the association of seamen near the entrance of the river, for the purpose of supplying pilots to vessels inwards, as well as one at Deptford or London for the supply to vessels outwards.

On arriving at the reign of Queen Elizabeth it is impossible not to be struck by the wisdom and foresight of the measures taken by that queen through the agency of the Trinity House for the purpose of forwarding the interests of the sea-service, measures the more to be regarded when brought into contrast with those of some of her successors. In the first year of her reign she recognised all the rights and immunities of the corporation (reciting in a charter confirming the same certain grants from King Edward VI. and Queen Mary); and in the 8th year of her reign an act was passed, enabling the corporation to preserve ancient sea-marks, to erect beacons, marks, and signs for the sea, and to grant licences to mariners during the intervals of their engagements to ply for hire as watermen on the river Thames. This act describes the members of the corporation as "a company of the chiefest and most expert masters and governors of ships incorporate within themselves, charged with the conduction of the queen's majesty's navy royal, and bound to foresee the good increase and maintenance of ships and of all kind of men traded and brought up by watercraft most meet for her majesty's marine service;" and after reciting the destruction of steeples, woods, and other marks on the coasts, whereby divers ships had been lost, to the great detriment and hurt of the common weal and the perishing of no small number of people, prohibits the destruction of any existing marks after notice, under a penalty of 100*l*., a very heavy fine in those days. An important question arose in the reign of James I., whether the words of the act of the 8th Elizabeth included *lighthouses*, which it would seem had not been introduced in England at the time it was passed: it appears to have been held by the two chief justices, 1 James I., that they did (4 *Inst.*, 149). Nevertheless, in 1616, Sir William Erskine and Sir John Meldrum having applied for a patent to erect lights at Winterton, the corporation of Trinity House petitioned against it, on the ground that they alone were entitled to make such erections, and the privy council decided in their favour. The king, however, was prevailed on to refer the matter to Sir Francis Bacon, then attorney-general, who reported his most able opinion in these striking words:—"That lighthouses are marks and signs within the meaning of the statute and charter. That there is an authority mixed with a trust settled in that corporation for the erection of such lighthouses and other marks and signs from time to time as the accidents and moveable nature of the sands and channels doth require, grounded upon the skill and experience which they have in marine service; and this authority and trust cannot be transferred from them by law, but as they only are answerable for the defaults, so they only are trusted with the performance, it being a matter of an high and precious nature, in respect of the salvation of ships and lives, and a kind of starlight in that element." This was read in council, and on the 26th March, 1617, an order was made reciting it, and "that their lordships found further cause to be confirmed in their first opinion that the masters of the Trinity House of Deptford Strond ought solely to have the erecting and disposing of all such sea-marks and signs, and that no other person ought to intermeddle therein; which their lordships did this day declare in council as the opinion of the board, with a saving still to his majesty's further pleasure. But withal straitly admonished the said masters of the Trinity House upon their duties, that as they were only trusted, and all others excluded, they should be careful to discharge

that trust which the state had reposed in them, and that in all places needful they should cause to be speedily and timely set up such lights and other sea-marks and signs as may serve for the safe direction of sea-faring men upon any of his majesty's coasts whatsoever, that the lives, ships, and goods of his majesty's subjects, friends, and allies may not be in danger of perishing through their negligence or want of care." King James probably disapproved of this decision, because it went to preclude him from exercising that lucrative trade in the sale of monopolies and patents which formed so principal a grievance of his reign. Accordingly very shortly afterwards, Sir Francis Bacon having been made lord keeper, the same point of law was referred to Sir Henry Yelverton, then attorney-general, and such of the king's council as he might think proper to call to his assistance.

The result was the following report, more satisfactory perhaps to his majesty, but the cause, in aftertime, of much evil, loss, and expense to the nation, because the management of several lighthouses was in consequence granted to individuals. After stating the circumstances, the Report, which is dated 4th June, 1617, goes on:—

"We herein certify our opinion to your lordships:—

"1. That lighthouses are signs and marks within the meaning of the statute aforesaid.

"2. That there is an authority given by the statute to the Trinity House, to erect such lighthouses if they think fit, and a trust reposed in them to do it if they will.

"3. That they of the Trinity House cannot transfer this authority to any other.

"But we are of opinion that the authority given to the Trinity House by the statute 8th of Elizabeth, taketh not away the power and right which was and still is in the Crown by the common law to erect such houses. For that statute is made wholly in the affirmative, that they of the Trinity House shall and may erect such lights and marks at sea, but excludes not his majesty. And we are informed that since the statute, both in the time of his majesty and of the late queen, there have been some lighthouses erected by authority from the crown.

"And therefore, howsoever the ordinary authority and trust for the performance of this service is committed to the said corporation alone, as persons of skill and trust to that purpose, yet if they be not vigilant to perform it in all places necessary, his majesty is not restrained to provide them according to his regal power and justice, for the safety of his subjects' lives, goods, and shipping in all places needful."

In the 36th year of her reign Queen Elizabeth, but partly it would seem at the praiseworthy instance and by the aid of Lord Howard of Effingham, her high admiral, made a grant to the corporation of the lastage and ballastage of all ships in the river Thames, and of the beaconage and buoyage upon the coasts of the realm, which had previously afforded a considerable source of revenue to the lord high admiral. The grant recites that he had surrendered into the queen's hands the lastage and ballastage of all ships coming into or being in the Thames, and also the right to erect and place beacons, buoys, marks, and signs for the sea, on it or on the shores, coasts, uplands, or forelands near it, and besought her to grant all powers respecting these matters to them. And it then proceeds to grant the same and all fees relating to them in the fullest manner to the corporation for ever.

James I. soon after his accession granted a charter of confirmation dated 1604. What else he did has already been stated, and by him and his successors various patents for and leases of lighthouses to individuals were at different times granted. Charles II. also granted to the Trinity House a charter of confirmation, but in the 17th year of his reign he granted the right of lastage and ballastage to one Colonel Carlos. This was the more extraordinary, because by the recital in his charter of the grant of Elizabeth he recognized the right to be in the corporation: it was however conferred upon Colonel Carlos on the assurance that it would not injure them, and the colonel was to pay 1000 marks a year for it into the Exchequer. The corporation resisted this grant successfully, and soon after Colonel Carlos surrendered it to the king, who re-granted it to the corporation for 31 years (Elizabeth's grant having been "for ever"), with the addition of all the waste lands bordering on the Thames from Staines Bridge to the Medway. This portion of the grant was however disputed by the City of London, and eventually the king re-granted it as it had been granted by Elizabeth, except that the fees and profits were expressly appropriated to the use of poor seamen, their wives, &c., and the 1000 marks were reserved to Colonel Carlos. The grant confirms the exemption of the brethren and their servants, &c. from all service, civil and military, unless by order of Privy Council. James II., who was much interested in naval matters, granted a fresh charter, the one now in force, in the first year of his reign. It recites the former grant and charter, and declares the body to be a corporation, and that for the future it shall consist of one master, and one deputy master, four wardens and four deputy wardens, eight assistants, and eight deputy assistants, eighteen elder brethren, and a clerk. The master nominated by the charter was Pepys, then secretary to the admiralty. It determines the mode of election of those officers, their continuance in office, and the mode of removing them from it, if necessary; and declares that all seamen and mariners belonging to the guild shall be younger brethren. It directs the masters and wardens to examine such boys of Christ's Hospital as shall be willing to become seamen, and to apprentice them to commanders of ships. It also enables them to appoint and license all pilots into and out of the Thames, and prohibits under penalties all other persons from exercising that office: it also authorises the corporation to settle rates of pilotage, &c., to hold courts, &c., to punish seamen deserting, &c., and make laws as to their subject-matters not inconsistent with the laws of the kingdom. It also contains many provisions directed to the object of keeping the navigation of the channels secret from foreigners, and renders the officers of the corporation liable to attend when required at the king's bidding. Since that time several acts of parliament have been passed for the purpose of authorising the Trinity House to regulate matters connected with the pilotage, &c. of vessels.

The various provisions in matters of pilotage under the management of the corporation were repealed by the 6 Geo. IV., c. 125, entitled 'An Act for the amendment of the law respecting pilots and pilotage, and also for the better preservation of floating lights, buoys, and beacons,' which recites the extent of the jurisdiction of the Trinity House in regard to pilots to be upon the river Thames, through the North Channel, to or by Orfordness, and round the Long Sand Head, or through the Queen's Channel, the South Channel, or other channels into the Downs, and from and by Orfordness and up the North Channel, and up the rivers Thames and Medway, and the several creeks and channels belonging or running into the same: and contains a variety of minute regulations respecting the examination, licensing, and employment of pilots, the rates of pilotage, provisions for decayed pilots, the protection of buoys, &c. At the present time however, besides those under the jurisdiction of the Trinity

House and the lord warden of the Cinque Ports, many independent pilotage establishments exist in various parts of the kingdom: but the expediency of subjecting all these to the sole, uniform management of the Trinity House has been felt for some time past, and will probably soon become the subject of parliamentary enactment. The inconvenience and disadvantage resulting from the exercise of similar authorities vested in the hands of different parties had been felt with regard to the lighthouses on the coast, several of which were vested in private hands by the crown; while some had been in times past leased out by the corporation itself, the lights in both instances being found to be conducted probably rather with a view to private interest than public utility. By an act therefore of the 6 & 7 Wm. IV., c. 79, passed "in order to the attainment of uniformity of system in the management of lighthouses, and the reduction and equalization of the tolls payable in respect thereof," provision was made for vesting all the lighthouses and lights on the coasts of England in the corporation of the Trinity House, and placing those of Scotland and Ireland under their supervision. Under this act, all the interest of the crown in the lighthouses possessed by his Majesty was vested in the corporation in consideration of 300,000*l.* allowed to the Commissioners of Crown Land Revenue for the same, and the corporation were empowered to buy up the interests of the various lessees of the crown and of the corporation, as well as to purchase the other lighthouses from the proprietors of them, subject in case of dispute to the assessment of a jury. Under this act purchases have been made by the corporation of the whole of the lighthouses not before possessed by that body, the amount expended for the purpose being little short of a million of money.

The annual revenue of the corporation is very considerable, and is derived from tolls paid in respect of shipping receiving benefit from the lights, beacons, and buoys, and from the ballast supplied. The ballast is raised from such parts of the bed of the river as it is expedient to deepen, by machinery attached to vessels, and worked partly by the power of steam, and partly by manual labour. The remainder of the revenue proceeds from lands, stock, &c., held by the corporation, partly by purchase, partly from legacies, &c., and donations of individuals. The whole is employed upon the necessary expenses of the corporation in constructing and maintaining their lighthouses and lights, beacons and buoys, and the buildings and vessels belonging to the corporation; in paying the necessary officers of their several establishments, and in providing relief for decayed seamen and ballastmen, their widows, &c. Many almshouses have also at various times been erected, which are maintained from the same funds. The present house of the corporation is on Tower Hill; the Trinity House was formerly in Water Lane, where it was twice destroyed by fire. Of the Elder Brethren, eleven consist of noblemen and heads of the government departments, admirals, &c., who are styled honorary brethren; twenty are maritime commanders, selected from the several branches of the merchant service, who have retired from employment; and recently one has been chosen from the service of her Majesty's navy. The younger brethren (who are unlimited in number), are or have been commanders of merchant-ships. Neither the honorary members nor the Younger Brethren derive any pecuniary advantage from their connection with the corporation. The present master is the Duke of Wellington. Mr. Pitt filled that office for seventeen years, and King William IV. was master at the time of his accession to the throne. Formerly, according to Stowe, sea-causes were tried by the Brethren, and their opinions were certified to the common-law courts and courts of Admiralty, such cases being referred to them for that purpose. This is not, however, the practice at present; but two of the Elder Brethren now sit as assistants to the judge in the court of Admiralty in almost all cases where any question upon navigation is likely to arise. The various duties of the corporation are parcelled out among the wardens and different committees appointed for the purpose of discharging the same. One of the most important of these is the Committee of Examiners, before whom all masters of vessels in the navy, as well as pilots, undergo an examination. The deputy master and Elder Brethren are from time to time employed on voyages of inspection of their lighthouses and lights, beacons and buoys, not unfrequently in most trying weather and seasons; and they are also often engaged in making surveys, &c. on the coast, and reports on such matters of maritime character as are referred to them by the government. The sums paid to the deputy master and Elder Brethren for their services are—to the former 500*l.* per annum, and 100*l.* further as the chairman of all committees, and to each of the Elder Brethren 300*l.* per annum.

Power of Learning.—As for fortune and advancement, the beneficence of learning is not so confined to give fortune only to states and commonwealths, as it doth not likewise give fortune to particular persons. For it was well noted long ago, that Homer hath given more men their livings than either Sylla, or Cæsar, or Augustus ever did, notwithstanding their great largesses and donatives, and distributions of lands to so many legions: and no doubt it is hard to say whether arms or learning have advanced greater numbers. And in case of sovereignty we see, that if arms or descent have carried away the kingdom, yet learning hath carried the priesthood, which ever hath been in some competition with empire.—*Lord Bacon.*

Food best adapted for Man.—The food best adapted for man is that which contains a due mixture of azotised matter (fibrine, albumen, &c.), and non-azotised matter (sugar, starch, &c.). Dr. Liebig says:—"A nation of hunters, on a limited space, is utterly incapable of increasing its numbers beyond a certain point which is soon attained. The whole of the carbon necessary for respiration must be obtained from the flesh of animals, of which only a limited number can find food on the space supposed. But 15 lbs. of flesh contain not more carbon than 4 lbs. of starch; and while the savage, with one animal and an equal weight of starch, could support life and health for a certain number of days, he would be compelled, if confined to flesh alone, in order to procure the carbon necessary for respiration and for the animal heat, to consume five such animals in the same period. It is easy to see, from these considerations, how close the connection is between agriculture and the multiplication of the human species. The cultivation of our crops has ultimately no other object than the production of a maximum of those substances which are adapted for assimilation and respiration in the smallest possible space. Grain and other nutritious vegetables yield us, not only in the form of starch, &c., the carbon which protects our organs from the action of oxygen and serves to produce also the heat essential to life, but also, in the form of vegetable fibrine, albumen, and caseine, our blood, from which all the other parts of the body are developed. Man, when confined to animal food, respires, like the carnivora, at the expense of the matters produced by the metamorphosis of organised tissues; and, just as the lion, tiger, and hyæna, in the cages of a menagerie, are compelled to accelerate the waste of the organised tissues by incessant motion, in order to furnish the matters necessary for respiration and for animal heat, so the savage, for the very same object, is forced to make the most laborious exertions, and to go through a vast amount of muscular exercise. He is compelled to consume force, merely in order to supply matter for respiration. Cultivation is the economy of force. . . . The unprofitable exertion of power, the waste of force in agriculture, in other branches of industry, in science, or in social economy, is characteristic of the savage state, or of the absence of cultivation."—*Quarterly Review.*



ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. I.

Giovanni Cimabue,

Born at Florence, 1240, died about 1302.

To Cimabue for three centuries had been awarded the lofty title of "Father of Modern Painting;" and to him, on the authority of Vasari, had been ascribed the merit, or rather the *miracle*, of having revived the art of painting when utterly lost, dead, and buried; of having by his single genius brought light out of darkness—form and beauty out of chaos. The error or gross exaggeration of Vasari in making these claims for his countryman has been pointed out by later authors: some have even denied to Cimabue any share whatever in the regeneration of art; and at all events it seems clear that his claims have been much over-stated; that so far from painting being a lost art in the thirteenth century, and the race of artists annihilated, as Vasari would lead us to believe, several contemporary painters were living and working in the cities and churches of Italy previous to 1240; and it is possible to trace back an uninterrupted series of pictorial remains and names of painters even to the fourth century. But in depriving Cimabue of his false glories, enough remains to interest and fix attention on the period at which he lived: his name has stood too long, too conspicuously, too justly, as a landmark in the history of art to be now thrust back under the waves of oblivion. A rapid glance over the progress of painting before his time will enable us to judge of his true claims, and place him in his true position relative to those who preceded and those who followed him.

The early Christians had confounded, in their horror of heathen idolatry, all imitative art and all artists. When, in the fourth century, the struggle between paganism and Christianity ended in the triumph and recognition of the latter, and art revived, it was, if not in a new form, in a new spirit, by which the old forms were to be gradually moulded and modified. The Christians found the shell of ancient art remaining: the traditionary handicraft still existed; certain models of figure and drapery, &c., handed down from antiquity, though degenerated and distorted, remained in use, and were applied to illustrate, by direct or symbolical representations, the tenets of a purer faith. From the beginning, the figures selected to typify our redemption were those of the Saviour and the Blessed Virgin, first separately, and then conjointly as the Mother and Infant. The earliest monuments of Christian art remaining are to be found, nearly effaced, on the walls and ceilings of the catacombs at Rome, to which the persecuted martyrs of the faith had fled for refuge. The first recorded representation of the Saviour is in the character of the Good Shepherd, and the attributes of Orpheus and Apollo were borrowed to express the

character of Him who "redeemed souls from Hell," and "gathered his people like sheep." In the cemetery of St. Calixtus at Rome a head of Christ was discovered, the most ancient of which any copy has come down to us: the figure is colossal; the face a long oval; the countenance mild, grave, melancholy; the long hair, parted on the brow, falling in two masses on either shoulder; the beard not thick, but short and divided. Here then, obviously imitated from some traditional description (probably the letter of Lentulus to the Roman Senate, supposed to be a fabrication of the third century), we have the type, the generic character since adhered to in the representations of the Redeemer. In the same manner traditional heads of St. Peter and St. Paul, rudely sketched, became in after-times the groundwork of the highest dignity and beauty, still retaining that peculiarity of form and character which time and long custom had consecrated in the eyes of the devout.

A controversy arose afterwards in the early Christian Church which had a most important influence on art as subsequently developed. One party, with St. Cyril at their head, maintained that the form of the Saviour being described by the Prophet as without any outward comeliness, he should be represented in painting as utterly hideous and repulsive. Happily the most eloquent and influential among the fathers of the church, St. Jerome, St. Augustin, St. Ambrose, and St. Bernard, took up the other side of the question; the pope, Adrian I., threw his infallibility into the scale; and from the eighth century we find it irrevocably decided, and confirmed by a papal bull, that the Redeemer should be represented with all the attributes of divine beauty which art in its then rude state could lend him.

The most ancient representations of the Virgin Mary now remaining are the old mosaics, which are referred to the latter half of the fifth century:* in these she is represented as a colossal figure majestically draped, standing, one hand on her breast, and her eyes raised to heaven; then succeeded her image in her maternal character, seated on a throne with the infant Saviour in her arms. We must bear in mind, once for all, that from the earliest ages of Christianity the Virgin Mother has been selected as the allegorical type of RELIGION in the abstract sense; and to this, her symbolical character, must be referred those representations of later times, in which she appears as trampling on the Dragon: as folding the nations of the earth within the skirts of her ample robe; as interceding for sinners; as crowned between heaven and earth by the Father and the Son.

Besides the representations of Christ and the Virgin, some of the characters and incidents of the Old Testament were selected as pictures, generally with reference to corresponding characters and incidents in the Gospel; thus St. Augustin, in the latter half of the fourth century, speaks of the sacrifice of Isaac as a common subject, typical, of course, of the Great Sacrifice. This system of corresponding subjects, of type and anti-type, was afterwards, as we shall see, carried much farther.

In the seventh century painting, as it existed in Europe, may be divided into two great schools or styles—the western, or Roman, of which the central point was Rome, and which was distinguished, amid great rudeness of execution, by a certain dignity of expression and solemnity of feeling; and the Eastern, or Byzantine school, of which Constantinople was the head-quarters, and which was distinguished by greater mechanical skill, by adherence to the old classical forms, by the use of gilding, and by the mean, vapid, spiritless conception of motive and character.

From the seventh to the ninth century the most important and interesting remains of pictorial art are the mosaics in the churches,† and the miniature paintings with which the MS. Bibles and Gospels were decorated.

But during the tenth and eleventh centuries Italy fell into a state of complete barbarism and confusion, which almost extinguished the practice of art in any shape; of this period only a few works of extreme rudeness remain. In the Eastern empire painting still survived; it became, indeed, more and more conventional, insipid, and incorrect, but the technical methods were kept up; and thus it happened that when, in 1204, Constantinople was taken by the Crusaders, and that the intercourse between the east and west of Europe was resumed, several Byzantine painters soon afterwards passed into Italy and Germany, where they were employed to decorate the churches; and taught the practice of their art, their manner of pencilling, mixing and using colours, and gilding ornaments, to such as chose to learn of them. They brought over the Byzantine types of form and colour, the long lean limbs, the dark-visaged Madonnas, the blood-streaming crucifixes; and these were followed more or less servilely by the native Italian painters who studied under them. Specimens of this early art remain, and in these later times have been diligently sought and collected into museums as curiosities, illustrating the history and progress of art: as such they are in the highest degree interesting; but it must be confessed that otherwise they are not attractive. In the Berlin Gallery, and in that of the fine arts at Florence, the best specimens have been brought together, and there are a few in the Louvre.‡ The subject is generally the Madonna and Child, throned, sometimes with angels or saints ranged on each side: the figures are stiff, the extremities long and meagre; the head of the Virgin generally declined to the left; the eyes long and narrow: the infant Saviour is generally clothed, and sometimes crowned; two fingers of his right hand extended in act to bless; the left hand holding a globe, a scroll, or a book. The ornaments of the throne and borders of the draperies, and frequently the background, are elaborately gilded; the local colours are generally vivid; there is little or no relief; the handling is streaky; the flesh-tints are blackish or greenish. At this time, and for two hundred years, afterwards (before the invention of oil-painting) pictures were painted either in fresco, an art never wholly lost, or on seasoned board, and the colours mixed with water thickened with white of egg or the juice of the young shoots of the fig-tree. This last method was styled by the Italians *a colla* or *a tempera*; by the French, *en détrempe*; and in English, *distemper*: and in this manner all movable pictures were executed previous to 1410.

It is clear that before the birth of Cimabue, that is, from 1200 to 1240, there existed schools of painting in the Byzantine style, and under Greek teachers, at Sienna and at Pisa; that the former produced Guido da Sienna, whose Madonna and Child, with figures the size of life, signed and dated 1221, is preserved in the church of San Domenico at Sienna. It is engraved in Rossini's 'Storia della Pittura,' on the same page with a Madonna by Cimabue, to which it appears superior in drawing, attitude, expression, and drapery. Pisa produced about the same time Giunta da Pisa, of whom there remain works with the date 1236: one of these is a Crucifixion, engraved in Otley's 'Italian School of Design,' and on a smaller scale in Rossini's 'Storia della Pittura,' in which the expression of grief in the hovering angels, who are wringing their hands and weeping, is very earnest and striking.

* At Venice and in the churches of Rome and Pisa.

† Particularly those in the church of Santa Maria Maggiore at Rome, and in the church of St. Mark at Venice.

‡ Nos. 980, 981, 982.

But undoubtedly the greatest man of that time, he who gave the grand impulse to modern art, was the sculptor Nicola Pisano, whose works date from about 1220 to 1270. Further, it appears, that even at Florence a native painter, a certain Maestro Bartolomeo, lived, and was employed in 1236.* Thus Cimabue can scarcely claim to be the "father of modern painting" even in his own city of Florence. We shall now proceed to the facts on which his traditional celebrity has been founded.

[To be continued.]

* Notes to 'Vasari,' edit. 1832.

ECONOMICAL USES OF THE PINE AND FIR.

The benefits which man receives from trees of the pine and fir genera are varied and important in a degree which deserves our attention. They furnish timber for houses and for ships; they form good roads; they provide for some nations a substitute for candles; their bark yields a tanning ingredient: various parts of them, in different countries, are converted into articles of food: they yield numerous varieties of the substances known as resin, pitch, tar, and turpentine: and they are serviceable, in a living state, in fixing sandy soils.

Let us first notice the edible properties of the pine and fir. These trees belong to the *Coniferæ*, or cone-bearing trees, and the cones of many varieties are customarily eaten in some countries. They are in fact the *fruit* of the pine: but the "pine-apple," commonly so called, is a misnomer, since it is the fruit of another kind of plant, which has obtained this name from its resemblance to the cone of the pine. The Romans used the cones of the pine to flavour their wine, and many modern nations do the same. The Laplanders grind the inner bark of the Scotch pine into a kind of coarse flour, which they make into bread. Mr. Laing says that he found this custom very prevalent in the cold countries of Norway and Lapland; and indeed many of the forests which used to supply timber for exportation are now almost destroyed, from the extensive use of the inner bark of the trees for food. A mixture of oat and pine meal is said to make very tolerable bread: the meal is made into a fluid paste, which is thrown on a hot pan and dressed in the manner of pancakes. In some parts of Siberia the young shoots, as well as the inner bark, are used for food. Evelyn states that chips of the Scotch pine were in his days used as a substitute for hops; and other writers state that the young shoots, stripped of their leaves when just about to appear, are sought for with avidity by the children of the peasantry, who eat them.

Of another species, the stone-pine, the kernels of the fruit have a taste which approaches to that of the hazel-nut, and in France and Italy are often introduced at the dessert. Sir G. Staunton mentions that the kernels of the stone-pine are also much relished by the Chinese. In Italy they are put into several kinds of ragoûts, and are often used as substitutes for almonds. In Provence they are used in conjunction with dried currants. These kernels are sometimes preserved in salt and sometimes in honey; but if kept closed within the cones, they will retain their vitality and freshness for five or six years.

Of another kind, the Cembra pine, the kernels are used as those of the stone-pine; and in addition to this they are made to yield oil: indeed, so abundant is the oil, that one pound of the kernels will yield twice as much as an equal weight of flax-seed. This oil is used both for food and for fuel. The shell of the kernel produces a red dye. The kernels, in some seasons, form the chief article of food in Siberia, and they are deemed valuable medicinal agents.

Without mentioning minor edible uses, we may briefly speak of the *spruce*, obtained from the spruce fir of America. Spruce beer is a kind of extract from the twigs and young shoots of this tree. The twigs are fastened into a faggot or bundle, and boiled for some time in a copper, till the bark separates from the twigs. While this is doing, a given weight of oats is roasted on a hot plate, together with a certain number of sea-biscuits or slices of bread. These ingredients are then put into the boiler and boiled with the twigs for some time. The spruce branches being then taken out, and the fire extinguished, the oats and the bread fall to the bottom, and the leaves, &c. rise to the top. Molasses or coarse brown sugar is added, and the liquor is immediately tunned off into a cask. Before the liquor becomes cold, half a pint of yeast is mixed with it, and well stirred, to incorporate it thoroughly with the liquor. In England spruce beer is made from the "essence of spruce," which is prepared in America by evaporating to the consistence of an extract the water in which the ends of the young branches of spruce fir have been boiled.

As timber-trees, the pine and the fir are so valuable, and are used in such a large variety of ways, that it would be utterly impracticable to enumerate them. One species yields long straight timbers for masts of ships; another is available for part of the hull; a third for flooring-boards in a house; and so on, every scrap of timber in all the varieties being available in one or other of various ways. We may take as a single instance the white pine, and quote the account which Michaux gives of the uses to which it is applied in America, where large numbers of the houses are entirely built of this wood:—"The ornamental work of the outer doors, the cornices and pieces of apartments, and the mouldings of fire-places, all of which in America are elegantly wrought, are of this wood. It receives gilding well, and is therefore selected for looking-glasses and picture-frames. Sculptors employ it exclusively for the images that adorn the bows of vessels, for which they prefer the kind called the pumpkin pine. At Boston, and in other towns of the Northern States, the inside of mahogany furniture and of trunks, the bottoms of Windsor chairs of an inferior quality, water-pails, a great part of the boxes used for packing goods, the shelves for shops, and an endless variety of other objects, are made of white pine. In the district of Maine it is employed for barrels to contain salted fish, especially the kind called the sapling pine, which is of a stronger consistence. For the magnificent wooden bridges over the Schuylkill at Philadelphia, and the Delaware at Trenton, and for those which unite Cambridge and Charlestown with Boston, of which the first is fifteen hundred and the second three thousand feet in length, the white pine has been chosen for its durability. It serves exclusively for the masts of the numerous vessels constructed in the northern and middle states; and for this purpose it would be difficult to replace it in North America."

As an example of the use of the pine in ship building the following inscription, given by Mr. Loudon in his 'Arboretum,' may be sufficient. In the entrance-hall of Gordon Castle in Scotland, there is a plank of Scotch pine about six feet long, by more than five broad, and in it is a brass plate bearing this inscription: "In the year 1783, William Osborne, Esq., merchant, of Hull, purchased of the Duke of Gordon the forest of Glenmore, the whole of which he cut down in the space of twenty-two years, and built, during that time, at the mouth of the river Spey, where never vessel was built before, forty-seven sail of ships of upwards

of 17,000 tons burden. The largest of them, of 1050 tons, and three others little inferior in size, are now in the service of his Majesty and the Honourable East India Company. This undertaking was completed at the expense (of labour only) of above 70,000*l*. To his Grace the Duke of Gordon this plank is offered, as a specimen of the growth of one of the trees in the above forest, by His Grace's most obedient servant, William Osborne. Hull, Sept. 26, 1836.'

In Russia, *roads* are formed of the trunks of the Scotch pine. The trees selected are such as have trunks from six to twelve inches in diameter at their thickest end. The branches of these are lopped off to the length of twelve or fifteen feet, according to the width of the intended road, but are left remaining at the ends. The ground being marked off for the road, and made somewhat even on the surface, the trees are laid down across it side by side, the thick end of one trunk alternating with the narrow end of another, and the branches at the ends of the trunks forming a sort of hedge on each side of the road. The interstices of the trunks are next filled up with soil; and the road is completed. The hedges formed by the branches in the extremities of the trunks are found extremely useful after snow has fallen, and before it has become hard with the frost, and also in the commencement of a thaw, in indicating to the traveller when his horses are getting too near the edge of the road. Roads of this rude description are very suitable for marshy ground, and are common in the interior of Russia, and also in some parts of Poland. Down to a recent period, the greater part of the road from St. Petersburg to Moscow was of this description. In some of the towns, particularly Moscow and Kiew, regularly squared planks are laid down instead of rough trunks; and, both in Moscow and Vienna, the courts of some of the larger mansions are paved with pieces of pine-trunk about eighteen inches in length, set side by side, and beaten down till they form a level surface. In America these log-roads are much used, and obtain there the name of "corduroy-roads," probably on account of a fancied resemblance between them and the ribbed appearance of the twilled stuff known as corduroy. In London, also, in all the various methods introduced and patented of wood pavement, now so rapidly increasing, the material, we believe, is in every case the fir or pine.

The chips of many kinds of pine burn so brightly that they form a valuable sort of fuel or illuminating agent to poor cottagers. In Scotland, flambeaux of pine-trunks and roots are much used; and a story is related of a wager laid in London by a Highland chief, that some massive silver candlesticks on the table at a gentleman's house where he was dining were not better, or more valuable, than those commonly in use in the Highlands. The chieftain won his bet, by sending to his estate for four highlanders of his clan, and producing them with torches of blazing fir in their hands, declaring that they were the candlesticks to which he alluded. The story has been also adopted by Sir W. Scott, in his 'Legend of Montrose.' Mr. Howison observes of the peasantry in Russia, that the little tallow or oil which they can procure is entirely consumed at the shrines in the churches and before the images in their huts. To supply the place of candles in their domestic arrangements, they take long billets of red Scotch pine, which they dry carefully near their stoves during the tedious winter, and split as occasion requires into long pieces resembling laths. When a traveller arrives, or a light is required for any other purpose, one of these laths is lighted at the stove, and fixed in a wooden frame, which holds it in a horizontal position. It gives a bright flame, but burns only for a short time.

All the species of pine and fir are used, in the respective countries where they grow, for a number of purposes scarcely susceptible of classification. Take the Norway spruce fir, for instance. It yields valuable fuel and charcoal. The ashes furnish potash. The bark is used in tanning; and the buds and young shoots for making spruce beer. The cones, boiled in whey, are deemed good against the scurvy. In Sweden and Switzerland the young shoots form a winter food for cattle and sheep; and the inhabitants of Finmark mix the points of the shoots with the oats given to horses. The floors of rooms in Norway and Sweden are, at least once a week, strewed over with the green tops, which on a white, well-scoured deal floor have a lively and pretty effect, and prevent the mud from the shoes adhering to and soiling the wood; giving out, at the same time, when trodden on, a refreshing odour. At Swedish funerals the road into the churchyard and to the grave is strewed with these green sprigs, the gathering and selling of which is a sort of trade for old poor persons about the towns. In both Sweden and Norway the inner bark is made into baskets; and the canoes, which are made of the timber of the large trees, and which are so light as to be carried on a man's shoulders when a rapid or cascade interrupts the navigation, have their planks fastened together with strings or cords made of the roots, so that not a single nail is used in their construction. The long and slender roots are made use of to form these strings, and they are rendered flexible by splitting them down the middle, and boiling them for two or three hours in water containing alkaline salts.

The Scotch pine, in addition to the uses already mentioned, yields excellent charcoal. The fagot wood of this kind of pine is said to be valued by the chalk and lime burners of England more than any other, on account of its rapid burning and intense heat, and consequent saving of time in tending the kilns. The leaves and branches are burned for potash, though of this alkali the tree yields only a small quantity. In the north of Russia and in Lapland the outer bark is used for covering huts, for lining them, and as a substitute for cork for floating the nets of fishermen. The inner bark is woven into mats, like those made from the lime-tree. Ropes are also made from the bark, which are said to be very strong and elastic, and are generally used by the fishermen.

In all these details we have refrained from mentioning those products which arise from the juices of the tree, and which, under various modifications, yield resins, turpentine, tar, pitch, lamp-black, and other substances valuable in the arts. These form a group of useful products of the pine and fir, so extensive and instructive, that it may be well to devote a separate paper to them.

Chinese Eatables.—They eat almost everything that comes to hand. Upon the streets of the city, but particularly on the large square before the factories, a number of birds are daily exposed for sale which amongst us have not yet gained much repute for flavour; among others, hawks, owls, eagles, and storks. To a European, nothing can have a more laughable effect than to see the Chinese arrive with a carrying-pole supporting two birdcages which contain dogs and cats instead of birds. A small thin sort of spaniel appeared to us to be most in request; they sit quite downcast in their temporary dwellings when they are brought to market, whilst the cats make a dreadful squalling, as if conscious of their fate. The flesh of these last, when they are well fed, is much esteemed in China, and they are often seen on the tables of the rich. Other Chinese bring upon their carrying-pole many dozens of rats, which are drawn quite clean, and, like pigs in our country, when they have been opened, are hung up by means of a cross piece of wood through the hind-legs. These rows of rats look very nice, but they are only eaten by the poor.—*Meyen's Voyage round the World.*



VENDEMMIA, OR ITALIAN VINTAGE.

In the design before us Bartolommeo Pinelli (in art Ultimus Romanorum!) brings out, to the life, a few of those figures and incidents which render parts of the Vendemmia or vintage in the south of Italy so graceful, picturesque, and classical. This is a season of joy, hilarity, and frolic, in all countries where the vine grows and ripens its generous fruit in abundance; and, nearly everywhere, some attempt, more or less happy, is made to get up some rural *Dionysia* (vintage feast) or some semi-classical masquerade, with songs and other allusions to the *Liber Pater*, the god of wine, the great Bacchus. But in Italy, and more particularly in the southern parts of that beautiful peninsula, where—in many secluded districts at least—the old Italic and Greco-Italic blood has been but comparatively little mingled with the blood of Goths or Visigoths, Huns or Lombards, Normans or any other of the northern races, the successive conquerors of the country; where the classical ages fill as large a portion of the popular traditions as the Gothic or dark or middle ages occupy in the traditions of the northern nations, mixing copiously with religious rites, and the usages, ceremonies, and observances of domestic life, and giving their point to popular proverbs, and furnishing out the vocabulary of household words; where the constant view of ruined temples, aqueducts, amphitheatres, mutilated statues, vases covered with classical designs, and coins and medals dug up out of the earth, and a constant hearing of the names of towns and villages, mountains and streams, that have scarcely varied from their designation in the days of the Cæsars, all serve to remind the people of the remote times when the pagan mythology was not "a creed outworn," but the popular belief,—these vintage feasts have a far more classical and earnest character. In minor particulars these very unlettered peasants not uncommonly travestie ancient characters. They invariably talk of Virgil, not as a poet, but as a mighty conjuror and necromancer—a sort of Friar Bacon or Michael Scott. Of Ovid (Ovidius Naso) they only pretend to know that he had a very big nose. Cicero, from an orator, statesman, philosopher, becomes in their parlance a synonyme for dandy, or for anything that is very fine: thus Castiglione tells us that he once heard a Roman peasant who was eulogizing his own jackass, exclaim in a rhapsody, "Ah! sirs, when he has got on his new pack-saddle, he looks like a very Cicero!" By another strange technical application of the word, every ragged illiterate rogue that acts as a guide and shows strangers the ancient sites and ruins is called a Cicero—*un Cicerone*. But though they never read mythology in books—for books of any kind are rarities among them, and very few or none of them can read—they are orally acquainted with the names of the gods and goddesses, and seldom make mistakes as to the characters and attributes of the higher divinities of the classical paganism: their traditions, and the ancient relics they see, almost with the force of reality or of a real belief, give to Jove his thunderbolt, and to Juno her chariot drawn by peacocks, her jealousy, and her

scolding habits; to Mars his helmet and spear and the fate of battles, and to Venus, born of the sea, her matchless beauty of face and form; Ceres brings the ripe corn that waves in the field and gives sustenance to man, and Bacchus the wine that makes glad his heart. Of these two last fabled divinities they will almost talk as of their favourite or patron saints. From one end of Italy to the other there are few exclamations more frequently in the mouths of the common people than the "Per Bacco!" (by Bacchus), although, be it said to their credit, they are not his votaries to any excess in drinking.

The Vendemmia, or Vintage, is a sort of rustic Carnival, or Saturnalia holiday, in which, from time immemorial, they have been accustomed to allow themselves, and to be allowed by their masters and superiors, a degree of liberty as large as obtained among the common people of ancient Rome, when they commemorated the freedom and equality which prevailed on earth in the golden reign of Saturn. As long as it lasts, the peasants employed in it indulge in a truly Fescennine licence of tongue with all who approach or chance to pass by, bespattering them with all manner of queer language, and pelting them with doggrel rhymes, without any regard to their rank or condition. When the wine is all trodden out in the wine-press—trodden out by the naked feet of jumping, frolicking, roaring swains—the prime part of the festival commences, consisting generally of a semi-ludicrous, semi-serious, classical procession, and of a good repast at the end of it. On more than one occasion we have observed a rather nice attention to detail, and certain delicate distinctions which were scarcely to have been expected from an ignorant, unread peasantry. One procession was really admirable. Bacchus, instead of being represented in the manner of our vulgar sign-painters, by a fat, paunchy, red-faced, drunken boy, was personified by the tallest, handsomest, and most graceful young man of the party; his head was crowned with a wreath of ivy and vine leaves, mixed with bunches of the purple grape, which hung down the sides and the back of his neck; in his right hand he carried a lance tipped with a cone of pine or fir-apple, and the shaft was entwined with ivy and vine leaves, and some wild autumnal flowers, the thing thus being, as nearly as might be, the classical thyrsus, one of the most ancient attributes of the god and his followers; a clean sheep's-skin, spotted with the red juice of the grape, in imitation of the skin of the panther or spotted pard which Bacchus is represented as wearing when he went on his expeditions, was thrown gracefully over his shoulders; he was followed by some silent, sedate women, carrying on their heads baskets filled with grapes; by little boys carrying in their hands large bunches of the same fruit; by Bacchante of both sexes, who carried sticks entwined with vine leaves; by two or three *carri*, or carts, which had been used to convey the ripe fruit to the wine-press, each drawn by a pair of tall cream-coloured oxen, with those large, dark, pensive eyes to which Homer thought it no disparagement to compare the eyes of the wife of Jupiter; and in the rear of all came Silenus, a fat old man with his face and hands besmeared with wine-lees, bestriding a fat old ass. The Bacchante bounded, danced, frolicked, and laughed uproarously; Silenus lolled and rolled upon his donkey, singing snatches of Vendemmia songs, making all sorts of ludicrous grimaces and gestures, and jocosely yet loudly abusing every stranger or neighbour he discovered in the throng. But Bacchus preserved the decorum and dignity of the true classical character of the god who was as graceful as Apollo, who shared with that divinity the dominion of Parnassus, and the faculty and glory of inspiring poets with immortal verse. The joyous shouts of *Viva Bacco! Viva la Vendemmia!* the laughs and shouts of the Bacchante, the songs and jokes of old Silenus, were mingled with the beat and jingle of two or three tambourines, with the rural sound of cow-horns, and occasionally with the blasts of a cracked but antique-looking trumpet, and with the clapping of hands and shoutings of all the men and women, boys and girls of the district. The Cæcuban hills, which bore the fruit productive of the generous wine which Horace extolled as the drink of Mæcenas—and which render as good wine now, though all unknown to fame, as they did in the days of Augustus Cæsar—echoed and re-echoed with the joyous sounds, for the scene of the festivity was at the foot of those hills, on whose sunny slopes the vines had ripened which furnished this happy vintage.

When questioned as to how they arranged their very classical procession, the peasants could only say that they did as they had done year after year, and as their fathers and grandfathers had done before them. The *Parocchiano*, or parish priest, who thought it no sin or degradation to follow the procession and partake in the feast, did not appear to have much more learning on the subject.

THE GREAT SIDON.

THE country of the Phœnicians, in which, at a very early period, flourished a town thus emphatically distinguished, was of very limited dimensions even at the time when the nation arrived at its highest condition of splendour and power. It comprehended that part of the Syrian coast which extends from Tyre northward to Aradus. This strip of land reached to about fifty leagues from north to south; but its utmost breadth did not exceed eight or ten leagues. The coast abounded in bays and harbours, and its breadth was traversed by mountains branching from Libanus, several of which advanced their promontories into the sea. The summits of these mountains were covered with forests, which afforded to the Phœnicians the most valuable timber for the construction of their ships and habitations. This explains how it happens that the first time this people is brought personally under our notice in the Bible is in the character of persons skilled in the hewing and transport of wood; including, no doubt, much ability in the preparation and application to various uses. When Solomon was going to build the Temple, he communicated to the king of Tyre his wish to enter into an engagement for a supply of timber, knowing, as he said, "There is not among us any that can skill to hew timber like unto the Sidonians." The answer of the Tyrian king is remarkable—"I will do all thy desire concerning timber of cedar and concerning timber of fir: my servants shall bring them down from Lebanon unto the sea; and I will convey them by sea, in floats, unto the place that thou shalt appoint me, and I will cause them to be discharged there." (1 *Kings*, v.) This was speaking like a man accustomed to the business.

The waves, breaking violently against the steep cliffs, seem to have detached several capes from the *terra firma*, forming islands, which the Phœnicians were not tardy in covering with numerous colonies and flourishing towns.

In this tract of country the great city of Sidon was founded. If it owed its foundation to Sidon, the eldest son of Canaan, whose name it seems to bear, it must have been one of the most ancient cities in the world. This is the common opinion, supported by the authority of Josephus. The town was, at any rate, very ancient: it must have existed long before the time of Joshua, for it is here called great—and a city must have time

to acquire greatness. Some indeed have taken occasion, from the expression "Great Zidon," to conclude that there were two Sidons—one much more considerable than the other; but no geographer or historian takes notice of any Sidon but this "Great Zidon." The greatness of Sidon was the result of its skill in manufactures and of its attention to commerce. The skill of the Sidonians in felling timber, and in applying it to use, has been already mentioned. They built ships. If they were not the first ship-builders and navigators of the world, they were undoubtedly the first who ventured beyond their own coasts, and the first that established anything that can be called a maritime commerce. The Sidonians are said to have been the first manufacturers of glass. Homer mentions them frequently, and always as excelling in many ingenious and useful arts, giving them the title of πολυδαίδαλοι; and, accordingly, all superior articles of dress, all good workmanship in making vessels for use, and all ingeniously contrived trinkets and toys, are ascribed by him to the skill and industry of the Sidonians.—Thus, the queen of Troy, intending to offer a mantle to Pallas,—

> "Herself, the while, her chamber, ever sweet
> With burning odours, sought. There stored she kept
> Her mantles of all hues, accomplish'd works
> Of fair Sidonians, wafted o'er the deep
> By godlike Paris, when the galleys brought
> The high-born Helen to the shores of Troy.
> From these the widest and of brightest dyes
> She chose for Pallas; radiant as a star
> It glitter'd, and was lowest placed of all."

Achilles, at the funeral games for Patroclus, proposes, as the prize for the best runner,—

> "A silver goblet, of six measures: earth
> Own'd not its like for elegance of form.
> Skilful Sidonian artists had around
> Embellish'd it; and o'er the sable deep,
> Phœnician merchants into Lemnos' port
> Had borne it, and the boon to Thaos giv'n."

When Telemachus expressed strong admiration of the wealth and splendour, in gold and silver, ivory and brass, which the palace of Menelaus exhibited, the latter accounts for it by observing that his treasures had been collected in his perilous wanderings, during which he had visited the shores of Cyprus, *Phœnicia, Sidon,* and Egypt. Lastly, in another place (*Odyss.* xv.), a story occurs, replete with indications of the character and pursuits of the Sidonians. At the island of Syria,—

> "It chanced that from Phœnicia, famed for skill
> In arts marine, a vessel thither came,
> By sharpers mann'd, and laden deep with toys."

The sailors meet on the beach a woman belonging to the family of the chief of the island. She was—

> "A fair Phœnician, tall, full-sized, and skill'd
> In works of elegance."

And on being interrogated, she tells her countrymen,—

> "I am of Sidon, famous for her wealth,
> By dyeing earn'd."

In pursuance of a plot laid between them, one of the men went to the palace, as if to dispose of Sidonian wares:—

> "An artist, such he seem'd, for sale produced
> Beads of bright amber riveted in gold."

These indications concerning a people situated so near to the Hebrews, and, in the end, so closely connected with them, are in no small degree interesting. The superiority in manufactures and commerce does not, however, form the only distinction of the Sidonians, for they were also great adepts in the sciences of their time, particularly astronomy and arithmetical calculation. As might naturally be expected, under such prosperous circumstances, the people lived in ease and luxury. For this they were early remarkable, as we see from a comparison used in speaking of the town of Laish:—"The people who dwelt in it were careless; *after the manner of the Sidonians,* quiet and secure; and there was nothing to molest them in the land: they possessed also riches without restraint." (*Judg.* xviii. 7—Boothroyd's version.)

Ultimately, however, Sidon was eclipsed, in all its characteristics of superiority, by Tyre, which is called in the Bible "the daughter of Sidon," it having been in its origin a settlement of the Sidonians. Whether the historical Tyre at this time existed is a question that occasions some discussion. The text of verse 29 is certainly by no means conclusive on this subject, into which we shall not at present enter further than to observe that if the old continental Tyre of history did at this time exist, it was evidently in its infant state, in which it could not be mentioned in comparison with that "great Sidon" which it was in the end destined to overshade. In support of the negative, much stress has been laid upon the silence of Homer, who so frequently mentions Sidon, but never Tyre. As we have just been quoting Homer, we may observe that there is nothing in this argument to rescue it from the suspicion which usually rests on arguments drawn from mere silence. Tyre existed and had a king in the time of David, and in the time of Solomon was a great commercial city; and the time of Homer is from one to two centuries later than the times of David and Solomon.

Although Sidon lost its superiority under the predominating influence of Tyre, it long remained a place of very considerable importance. Its general history is so much connected with that of Tyre, that we shall not here mention it separately. Tyre is now a complete desolation; but Sidon still subsists as a town, and carries on some traffic with the neighbouring coasts. It is now called Saide or Seide. The inhabitants are estimated at about fifteen thousand, who are chiefly occupied in spinning cotton, which, with silk and boots, shoes, and slippers of morocco leather, form the principal articles of their trade. The port is now nearly choked up with sand. The town rises immediately from the strand, and presents a rather imposing appearance as viewed from a distance; but the interior is wretched and gloomy, ill-built, dirty, and full of ruins. Outside the walls, fragments of columns and other remains of the ancient city may still be discovered. The following remarks, from Mr. Jowett's 'Christian Researches in Syria,' respecting the country between Tyre and Sidon, will be interesting:—"About halfway between Saide (Sidon) and Sour (Tyre) are very extensive ruins of towns which once connected these two cities; but of these ruins there is scarcely one stone left upon another. They consist chiefly of lines which show, rased even with the soil, the foundation of houses—many stones irregularly scattered—a few cisterns with half-defaced sculpture on them; and at a considerable distance from the path there are at one spot several low columns, either mutilated or considerably sunk in the earth. These relics show—what it needed, indeed, no such evidence to prove—that in peaceable and flourishing times, on this road, between two such considerable cities as Tyre and Sidon, there must have been many smaller towns for business, pleasure, or agriculture, delightfully situated by the sea-side: but peaceful security has long been a blessing unknown to these regions."

Wolves in Spain.—I sat down in the venta where I put up: there was a huge fire, consisting of the greater part of the trunk of an olive-tree; the company was rather miscellaneous—a hunter with his escopeta; a brace of shepherds with immense dogs, of that species for which Estremadura is celebrated; a broken soldier, just returned from the wars; and a beggar, who, after demanding charity *por las siete llagas de Maria Santissima*, took a seat amidst us, and made himself quite comfortable. The hostess was an active, bustling woman, and busied herself in cooking my supper, which consisted of the game which I had purchased at Jaraicejo, and which, on my taking leave of the gipsy, he had counselled me to take with me. In the mean time, I sat by the fire, listening to the conversation of the company. "I would I were a wolf," said one of the shepherds; "or, indeed, anything rather than what I am. A pretty life is this of ours, out in the campo, among the carascales, suffering heat and cold for a peseta a day. I would I were a wolf: he fares better, and is more respected, than the wretch of a shepherd." "But he frequently fares scurvily," said I; "the shepherd and dogs fall upon him, and then he pays for his temerity with the loss of his head." "That is not often the case, señor traveller," said the shepherds: "he watches his opportunity, and seldom runs into harm's way. And as to attacking him, it is no very pleasant task; he has both teeth and claws, and dog or man who has once felt them likes not to venture a second time within his reach. These dogs of mine will seize a bear singly with considerable alacrity, though he is a most powerful animal; but I have seen them run howling away from a wolf even though there were two or three of us at hand to encourage them." "A dangerous person is the wolf," said the other shepherd, "and cunning as dangerous: who knows more than he? He knows the vulnerable point of every animal: see, for example, how he flies at the neck of a bullock, tearing open the veins with his grim teeth and claws. But does he attack a horse in this manner? I trow not." "Not he," said the other shepherd, "he is too good a judge; but he fastens on the haunches, and hamstrings him in a moment. Oh! the fear of the horse when he comes near the dwelling of the wolf. My master was the other day riding in the despoblado, above the pass, on his fine Andalusian steed, which had cost him five hundred dollars: suddenly the horse stopped, and sweated and trembled like a woman in the act of fainting; my master could not conceive the reason, but presently he heard a squealing and growling in the bushes, whereupon he fired off his gun, and scared the wolves, who scampered away: but he tells me that the horse has not yet recovered from his fright." "Yet the mares know, occasionally, how to baulk him," replied his companion: "there is great craft and malice in mares, as there is in females: see them feeding in the campo with their young cria about them; presently the alarm is given that the wolf is drawing near; they start wildly, and run about for a moment, but it is only for a moment,—amain they gather together, forming themselves into a circle, in the centre of which they place the foals. Onward comes the wolf, hoping to make his dinner on horse-flesh; he is mistaken, however, the mares have baulked him, and are as cunning as himself: not a tail is to be seen—not a hinder quarter—but there stand the whole troop, their fronts towards him ready to receive him, and as he runs round them barking and howling, they rise successively on their hind legs, ready to stamp him to the earth, should he attempt to hurt their cria or themselves." "Worse than the he-wolf," said the soldier, "is the female; for, as the señor pastor has well observed, there is more malice in women than in males: to see one of these she-demons with a troop of the males at her heels is truly surprising; where she turns they turn, and what she does that do they; for they appear bewitched, and have no power but to imitate her actions. I was once travelling with a comrade over the hills of Galicia, when we heard a howl: 'Those are wolves,' said my companion; 'let us get out of the way:' so we stepped from the path, and ascended the side of the hill a little way, to a terrace, where grew vines, after the manner of Galicia: presently appeared a large grey she-wolf, *deshonesta*, snapping and growling at a troop of demons, who followed close behind, their tails uplifted, and their eyes like firebrands. What do you think the perverse brute did? Instead of keeping to the path, she turned in the very direction in which we were: there was now no remedy; so we stood still. I was the first upon the terrace, and by me she passed so close, that I felt her hair brush against my legs: she, however, took no notice of me, but pushed on, neither looking to the right nor left, and all the other wolves trotted by me without offering the slightest injury or even as much as looking at me. Would that I could say as much for my poor companion, who stood farther on, and was, I believe, less in the demon's way than I was; she had nearly passed him, when suddenly she turned half round and snapped at him. I shall never forget what followed; in a moment a dozen wolves were upon him, tearing him limb from limb, with howlings like nothing in this world; in a few moments he was devoured, nothing remaining but the skull and a few bones, and then they passed on in the same manner as they came. Good reason had I to be grateful that my lady-wolf took less notice of me than my poor comrade."—*The Bible in Spain, by George Borrow*

Ripening of Fruit.—So long as the fruit is green it possesses to a certain extent the physiological action of a leaf, and decomposes carbonic acid under the influence of light; but as soon as it begins to ripen this action ceases, and the fruit is wholly nourished by the sap elaborated by the leaves. Thus the fruit has, in common with the leaves, the power of elaborating sap, and also the power of attracting sap from the surrounding parts. Hence we see that where a number of fruits are growing together, one or more of them attract the sap or nutriment from all the rest, which in consequence drop off. As the food of the fruit is prepared by the leaves under the influence of solar light, it follows that the excellence of the fruit will depend chiefly on the excellence of the leaves; and that if the latter are not sufficiently developed, or not duly exposed to the action of the sun's rays, or placed at too great a distance from the fruit, the latter will be diminutive in size and imperfectly ripened, or may drop off before attaining maturity. Hence the inferiority of fruits which grow on naked branches, or even on branches where there is not a leaf close to the fruit; as in the case of a bunch of grapes, where the leaf immediately above it has been cut off, or in that of a gooseberry, where the leaf immediately above it has been eaten by a caterpillar. Hence it is evident that the secretions formed by the fruit are principally derived from the matter elaborated in the leaf or leaves next to it; and as the sap of all the leaves is more or less abundant according to the supply received from the roots, the excellence of fruits depends ultimately on the condition of the roots, and the condition, position, and exposition of the leaves.—*Loudon's Suburban Horticulturist.*

Coaches in Yucatan.—I left Merida by coach for Campeachy. It started at five o'clock in the morning with three passengers; an elderly woman and man, and myself, composing the load. The team galloped off at the rate of ten miles an hour, and changed horses every hour during the route. The coach was one of four which were imported from Troy (U. S.), and, as a sample, was well worthy of the high reputation the Trojan carriages enjoy throughout the United States; but the horses and harness were in shocking bad keeping. The driver was an Indian; besides whom were two other attendants, who were needed, for the unskilful hands of the Indian and the wildness of the horses made the vehicle go on all sides of the road. It was no uncommon occurrence to be brought up against a stone wall at the side of the road; and, in one instance, we were foul of an Indian hut, which frightened the inmates to such a degree that they ran out, supposing it to be an earthquake. By combining the skill and strength of our whole party, we succeeded in getting the horses and coach again upon the highway. We stopped at a village to take breakfast, and passed through several towns on the road, but they afforded nothing worthy of remark. The country through which our route lay presented the same aspect as other parts we had visited. The fields were still covered with weeds, to burn which the proprietors of the soil were only waiting for dry weather. This is the only preparation the soil receives prior to sowing it. The progress of the coach afforded us much amusement by the fright which it appeared to occasion to all animated nature in our way. This line of coaches had been only a short time established, and its whirling along among people and cattle had a similar effect to that a locomotive has among the animals and their owners in the wilds of the far West. Nothing would stand before it. Away went horse and rider, mule and packs, to secure a safe retreat in the bushes, at the alarming sound of our approach. Our arrival in the town brought out the whole population, and the Indians would come round the coach aching with curiosity, their countenances expressive both of fear and admiration.—*Norman's Rambles in Yucatan.*

A DAY AT THE BRITISH NEEDLE-MILLS, REDDITCH.



[Needle pointer at work.]

WHY are needles made at Redditch? Why should a beautiful and secluded part of the county of Worcester, many miles distant from what are termed the "manufacturing districts," contain a village whose inhabitants, one and all, live directly or indirectly by making these little steel implements? The fact is demonstrable, but the reason is not. The good housewife who mends her child's pinafore, the milliner who decks out a lady in her delicate attire, the hard-working sempstress who supplies "made-up goods" to the shops, the school-girl who works her sampler—all, however little they may be aware of the fact, are dependent principally on a Worcestershire village for the supply of their needles. Their 'Whitechapel Sharps' are no longer made at Whitechapel, even if they ever were so; and though they may in some cases seem to emanate from London manufacturers, the chances are that they were made at Redditch. Not that other towns are without indications of this branch of manufacture; but in them it is merely an isolated feature, each manufacturer gathering round him a body of workmen sufficient for his purpose. But at Redditch, as we shall presently see, needle-making is the staple, the all-in-all, without which almost every house in the place would probably be shut up; for although there is a fair sprinkling of the usual kind of workmen, shopkeepers, dealers, &c., these are only such as are necessary for supplying the wants of the needle-making population.

It is a strange thing that the Redditch manufacturers themselves seem scarcely able to assign a reason why this branch of industry has centred there, or to name the period of its commencement. Indeed the early history of the needle-trade is very indistinctly recorded. Stow tells us, while speaking of the kind of shops found in Cheapside and other busy streets of London, that needles were not sold in Cheapside until the reign of Queen Mary; and that they were at that time made by a Spanish negro, who refused to discover the secret of his art. Another authority states, that "needles were first made in England by a native of India in 1545, but the art was lost at his death; it was, however, recovered in 1650, by Christopher Greening, who settled, with his three children, at Long Crendon, in Buckinghamshire." Whether the "negro" in the one of these accounts is the same individual as the "native of India" mentioned in the other, cannot now perhaps be determined; nor is it more clear at what period Redditch became the centre of the manufacture. There are slight indications of Redditch needle-making for a period of nearly two centuries, but beyond that all is blank.

A reader who associates the Potteries with the clay districts of North Staffordshire, and the smelting-works with the coal and iron districts of South Staffordshire, will naturally seek to know whether any features distinguish Redditch which will enable us to assign a probable origin for the needle-manufacture there. Let him take, with us, a survey of the surrounding district, and judge. Perhaps Birmingham may be taken as a centre to start from, being itself a chief seat of manufactures in metal. We proceed to Bromsgrove, making

the Birmingham and Gloucester Railway our line of transit; for in these railroad days we are often obliged to travel in a much more roundabout way to small towns than when stage-coaches were in the height of their power.

To Bromsgrove then we proceed, and soon find that the iron and coal region is being left behind us. We leave the smoking chimneys of Birmingham, and soon get into the undulating and picturesque districts of Worcestershire. For miles nothing like a factory or a manufacturing town is to be seen; green fields, ivy-covered churches, and secluded villages have superseded them. On a commanding height an obelisk or pillar, visible for many miles on every side, marks the domains of the squire, the "great man" of the neighbourhood; while the outline of the Malvern Hills is dimly marked at a distance. After descending the famous "Lickey incline," where the railway slopes an inch in a yard for more than two miles of length, we come to Bromsgrove, an ancient market-town, which serves as a centre for the villages around. We then bid a farewell to railroad, to stage-coaches, to omnibuses; we must either trudge it on foot, or hire a vehicle to traverse the six miles which separate Bromsgrove from Redditch. Here we get still more into the country, and marvel still more that a seat of manufacture should be found here. We do not see waggons laden with manufactured goods, nor workmen hastening homeward to their meals; but we see women returning from Bromsgrove market, seated on rough little horses, with panniers on either side of them; we see, too, cottages, whose white exteriors are decked with black lines in a fashion very prevalent in Worcestershire, and intended, we presume, to be ornamental. Fields and hedges, hills and valleys, diversify the whole distance.

At length a turn in the road brings us within sight of the village which we seek. Redditch lies spread out before us, its red brick houses forming a striking contrast with the green fields seen in the distance. Among the houses met with on entering the village are some of a superior order to the rest; and these we find on inquiry to be the private residences of the chief needle-manufacturers, the men whose capital gives activity to all the other inhabitants of the place. Soon we see evidences of factory arrangements, in buildings plentifully supplied with windows; and on advancing farther into the village (for a village it still is, although the inhabitants are now becoming numerous), we meet with the dwellings of the workmen and the shops of the dealers who supply their daily wants. A visitor, in any degree accustomed to watch the progress of manufactures, then naturally looks around him to seek for any indications whence he may account for the location of the needle-making: he looks for a stream, or canal, or something which may be to the manufacture in the relation of cause to effect; but very little of the kind is to be seen. Needle-making is nearly all the result of manual dexterity, requiring very little aid indeed from water or steam power. There are, it is true, a few water-wheels employed in working machines for 'scouring' the needles; but Redditch presents no other facilities for this purpose than such as are presented by a thousand other places in the kingdom. In short, there seems to be no other mode of accounting for the settlement of the needle-manufacture in this spot than that which may be urged in reference to watch-making in Clerkenwell or coach-making in Long Acre. A needle-maker, we will suppose—say two centuries ago—settled at Redditch, and gradually accumulated round him a body of workmen. A supply of skilled labour having been thus secured, another person set up in the same line,—perhaps enticing away some of the men from his predecessor. In time the workmen's children learned the occupation carried on by their parents, and thus furnished an increased supply of labour, which, in its turn, led to the establishment of other manufacturing firms. By degrees so many needles were made at Redditch, that the village acquired a reputation throughout the length and breadth of the land for this branch of manufacture, and hence it became a positive advantage for a maker to be able to say that his needles were "Redditch needles." This train of surmises may perhaps approach pretty nearly to the truth.

Let us, however, leave conjecture, and proceed to facts. There are in Redditch about a dozen manufacturers, each of whom conducts the needle-manufacture on a large scale, and employs a considerable number of persons. The workpeople are of two kinds, distinctly separated by the terms on which their services are rendered. Some work in factories, built by and conducted under the superintendence of the master manufacturers; while others work at their own homes, being paid according to the kind and amount of the work done. In no occupation, perhaps, is the division of labour more strictly carried out than in needle-making, for the man who anneals does not point, nor does the pointer make the eyes or polish the needles. Both within and without the factory the same system of division is kept up; for a cottager who procures work from a needle-manufacturer does not undertake the making of a needle, but only one particular department, for which he is paid at certain recognised prices. Many of the workpeople live at a few miles distance, and come with their finished work at intervals of a few days; a plan which can be adopted without much inconvenience, since a considerable quantity of these little articles may be packed in a small space. It is, we believe, estimated that the number of needle-makers in Redditch is about three thousand; and in the whole district of which Redditch is the centre, six or seven thousand, of whom a very considerable number are females.

The general name of 'mills' is given to the needle-factories, each one having some distinctive name whereby it may be indicated. Thus the establishment which we have been obligingly permitted to visit, and the arrangements of which will be described in this paper, is called the "British Needle-Mills." "What's in a name?" We need not stop to inquire: it will suffice to say that this custom is very prevalent in the factories of the north, and no doubt facilitates the distinguishing of one factory from another. To the "British Needle-Mills" of Mr. Thomas, then, our visit is directed.

This factory has been recently constructed, and is situated at one extremity of the village. It consists of a number of small court-yards or quadrangles, each surrounded by buildings wherein the manufacture is carried on. The object of this arrangement seems to be to obtain as much light as possible in the workshops, since most of the departments of needle-making require a good light. Some of the rooms in the factory are small, containing only three or four men; while others contain a great many workmen, according to the requirements of the several processes of the manufacture. From the upper rooms of the factory the surrounding hilly districts of Worcestershire are seen over a wide extent, wholly uninterrupted by any indications of manufacture or of town bustle; and it is while glancing over this prospect that one wonders how on earth needle-making came to speckle such a scene.

The subdivisions of the factory correspond with those in the routine of manufacture; and we accordingly find that, while some of the shops are occupied by men, others contain only females, and others again

furnish employment chiefly for boys. We should surprise many a reader were we to enumerate all the processes incident to the manufacture of a needle, giving to each the technical name applied to it in the factory. The number would amount to somewhere about thirty; but it will be more in accordance with our object to dispense with such an enumeration, and to present the details of manufacture in certain groups, without adhering to a strictly technical arrangement.

First, then, for the material. It is scarcely necessary to say that needles are made of steel, and that the steel is brought into the state of fine wire before it can assume the form of needles. The needle-makers are not wire-drawers: they do not prepare their own wire, but purchase it, in sizes varying with the kind of needles which they are about to make, from Sheffield or Birmingham, or some similar town. We will suppose, therefore, that the wire is brought to the needle-factory, and is deposited in a store-room. This room is kept warmed by hot air to an equable temperature, in order that the steel may be preserved free from damp or other sources of injury. Around the walls are wooden bars or racks, on which are hung the hoops of wire. Each hoop contains, on an average, about twelve or fourteen pounds of wire, the length varying according to the diameter. Perhaps it may be convenient to take some particular size of needle, and make it our standard of comparison during the details of the process. The usual sizes of sewing needles are from No. 1, of which twenty-two thicknesses make an inch, to No. 12, of which there are a hundred to an inch. Supposing that the manufacturer is about to make sewing-needles of that size which is known to sempstresses as No. 6—then the coil of wire is about two feet in diameter; it weighs about thirteen pounds; the length of wire is about a mile and a quarter; and it will produce forty or fifty thousand needles. The manufacturer has a gauge, consisting of a small piece of steel, perforated at the edge with eighteen or twenty small slits, all of different sizes, and each having a particular number attached to it. By this gauge the diameter of every coil of wire is tested, and by the number every diameter of wire is known.

A coil of wire, when about to be operated on, is carried to the 'cutting-shop,' where it is cut into pieces equal to the length of two of the needles about to be made. Fixed up against the wall of the shop is a ponderous pair of shears, with the blades uppermost. The workman takes probably a hundred wires at once, grasps them between his hands, rests them against a gauge to determine the length to which they are to be cut, places them between the blades of the shears, and cuts them by pressing with his body or thigh against one of the handles of the shears. The coil is thus reduced to twenty or thirty thousand pieces, each about three inches long; and as each piece had formed a portion of a curve two feet in diameter, it is easy to see that it must necessarily deviate somewhat from the straight line. This straightness must be rigorously given to the wire before the needle-making is commenced; and the mode by which it is effected is one of the most remarkable in the whole manufacture. In the first place the wires are annealed. Around the walls of the annealing-shop we see a number of iron rings hung up, each from three or four to six or seven inches in diameter, and a quarter or half an inch in thickness. Two of these rings are placed upright on their edges, at a little distance apart; and within them are placed many thousands of wires, which are kept in a group by resting on the interior edges of the two rings. In this state they are placed on a shelf in a small furnace, and there kept till red hot. On being taken out, at a glowing heat, they are placed on an iron plate, the wires being horizontal, and the rings in which they are inserted being vertical. The process of 'rubbing' (the technical name for the straightening to which we allude) then commences. The workman, as here represented, takes a long piece



of iron or steel, perhaps an inch in width, and, inserting it between the two rings, rubs the needles backwards and forwards, causing each needle to roll over on its own axis, and also over and under those by which it is surrounded. The noise emitted by this process is just that of filing: but no filing takes place; for the rubber is smooth, and the sound arises from the rolling of one wire against another. The rationale of the process is this:—the action of one wire on another brings them all to a perfectly straight form, because any convexity or curvature in one wire would be pressed out by the close contact of the adjoining ones. The heating of the wires facilitates this process; and the workman knows, by the change of sound, when all the wires have been 'rubbed' straight. By the facility of the moving of the rings on the bench, the facility of movement among the wires in the rings, and the peculiar mode in which the workman applies his tools, every individual wire is in turn brought in contact with the rubber.

Our needles have now assumed the form of perfectly straight pieces of wire, say a little more than three inches in length, blunt at both ends, and dulled at the surface by exposure to the fire. Each of these pieces is to make two needles, the two ends constituting the points; and both points are made before the piece of wire is divided into two. The pointing immediately succeeds the rubbing, and consists in grinding down each end of the wire till it is perfectly sharp. This is the part of needle-making which has attracted more attention than all the rest put together. The surprising manipulation by which the needles are applied to the grindstone; the rapidity with which the grinding is effected; the large earnings of the men; the ruined health and early death which the occupation brings upon them; the efforts which have been made to

diminish the hurtfulness of the process; and the resistance with which these efforts have been met—all merit and have received a large measure of attention. Let us first notice the process itself, and then the peculiar circumstances attending it.

Some of the needle-pointers work at their own homes, while some work at the factories; but the process is the same in either case. The pointing-room, generally situated as far away as practicable from the other rooms, contains small grindstones, from about eight inches to twenty inches in diameter, according to the size of needle to be pointed. They rotate vertically, at a height of about two feet from the ground, and with a velocity frequently amounting to two thousand revolutions per minute. The stone is a particular kind of grit adapted for the purpose; but sometimes it flies in pieces, from the centrifugal force engendered by the rapid rotation; and in such cases the results are often fearful. The workman sits on a stool, or 'horse,' a few inches distant from the stone, and bends over it during his work. Over his mouth he wraps a large handkerchief; and as he can perform his work nearly as well in the dark as in the light, he is sometimes only to be seen by the vivid cone of sparks emanating from the steel while grinding. The vivid light reflected on his pale face, coupled with the consciousness that we are looking at one who will be an old man at thirty, and who is being literally "killed by inches" while at work, render the processes conducted in this room such as will not soon be forgotten.

The needle-pointer takes fifty or a hundred needles, or rather needle-wires, in his hand at once, and holds them in a peculiar manner. He places the fingers and palm of one hand diagonally over those of the other, and grasps the needles between them, all the needles being parallel. The thumb of the left hand comes over the back of the fingers of the right; and the different knuckles and joints are so arranged, that every needle can be made to rotate on its own axis, by a slight movement of the hand, without any one needle being allowed to roll over the others. He grasps them so that the ends of the wires (one end of each) projects a small distance beyond the edge of the hand and fingers; and these ends he applies to the grindstone in the proper position for grinding them down to a point. It will easily be seen, that if the wires were held fixedly, the ends would merely be bevelled off, in the manner of a graver, and would not give a symmetrical point; but by causing each wire to rotate while actually in contact with the grindstone, the pointer works equally on all sides of the wire, and brings the point in the axis of the wire. At intervals of every few seconds, he adjusts the needles to a proper position, against a stone or plate, and dips their ends in a little trough of liquid between him and the grindstone. Each wire sends out its own stream of sparks, which ascends diagonally in a direction opposite to that at which the workman is placed. So rapid are his movements, that he will point seventy or a hundred needles, forming one hand-grasp, in half a minute; thus getting through ten thousand in an hour!

The circumstance which renders this operation so very destructive to health is, that the particles of steel, separated from the body of the wire by the friction of the stone, float in the air for a time, and are then inhaled by the workman. The entire atmosphere of the room is filled with these particles. Benevolent men had long sought for means of obviating the sad effects resulting from this operation; and at length the Society of Arts offered a premium for the invention of any piece of apparatus which should prevent the entrance of the steel particles into the mouth of the workmen. A period of more than twenty-one years has now elapsed since the contrivances of Mr. J. H. Abraham, having this object in view, were introduced to public notice through the medium of the above-named Society: and it is really surprising to find how utterly useless have been all the efforts to draw the men into the adoption of improved plans. The fortieth volume of the Society's 'Transactions' contains details which must not be passed over here in silence.

In the month of August, 1821, Mr. Abraham of Sheffield sent to the Society a model of a mouth-guard, to be used by the needle-pointers and dry-grinders. He was not at the time aware that a premium had been offered by the Society on this subject; but in October of the same year he sent a second communication, in which, among other details, he stated:—"The Society may not perhaps be in the possession of the information that thousands of individuals in this country, besides the needle-pointers, who have been regularly employed in dry-grinding, have been cut off at the age of from thirty to forty years." After describing the nature of his apparatus, Mr. Abraham proceeds to remark that the needle-pointers and dry-grinders, "after the grinders' asthma begins to afflict them, which generally happens to those regularly employed in dry-grinding, when they arrive at the age of twenty-five or twenty-seven years, linger out a miserable existence till they arrive at the age of thirty or thirty-five years; beyond the age of forty years very few dry grinders are known to live."

The apparatus consists of two parts. The first is a screen, so suspended from the ceiling as to shield the man from the greater part of the grit and steel-dust set in motion by his work. The second is a mouth-guard, to arrest the progress of such particles as might reach his lips. This mouth-guard consists of a small frame of wood, the upper and lower pieces of which are made circular to fit the lips. On this are fixed two or three layers of crape or muslin; and it is studded with several small magnets, calculated to arrest a considerable portion of the deleterious matter before it can reach the crape. To the upper part of this wooden frame is attached a bent wire, to which crape is fixed for the purpose of protecting the nostrils; and the whole is fastened by two strings passing round the head and tying behind.

Such are the two pieces of apparatus contrived by Mr. Abraham for protecting the workman not only from the particles of steel, but also from the grit detached from the grindstone during the process. It may now be asked, how far were these contrivances efficient? Let the evidence of the needle-manufacturers attest. The volume of the Society's 'Transactions' before referred to, contains several memorials or testimonials, among which is one signed by several surgeons, to the effect that the apparatus completely succeeded in arresting the particles; the mouth-guard becoming wholly coated with particles, which would otherwise have passed into the mouth of the workman. Another is a letter from the proprietors of a needle-factory in Derbyshire, expressing their anxious wish that these humanizing arrangements should be adopted, and stating, among other things, that the needle-pointer who used them most had "not more dust floating about him in a whole day than he used to have in a quarter of an hour." The third is a letter from Redditch, signed by five needle-manufacturers and two pointers, to the effect that the arresting of the steel particles was successfully performed by the mouth-piece. A similar letter was afterwards signed by nine of the manufacturing firms at Redditch, twelve of the pointers (whose state of education may be guessed by the fact that ten out of the twelve made their mark ×), and other inhabitants of the place.

Might it not be supposed that such contrivances

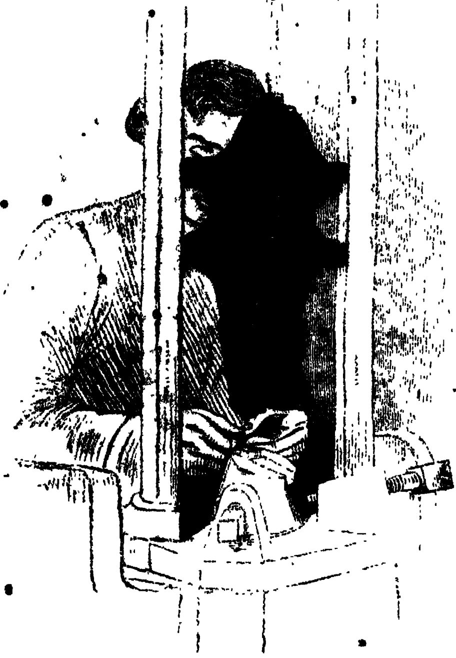
would be eagerly caught at by the men? Such would seem to be reasonable; for it is understood that Mr. Abraham had no other motives than those of kindness for promulgating his inventions. Yet has the whole become a dead letter. We believe we are correct in saying that the needle-pointers as a body, of whom there are about a hundred and thirty at Redditch, refuse to adopt these arrangements, perhaps that their wages may not be lowered by rendering the work less injurious. Their earnings sometimes amount to so large a sum as a guinea a-day; and are at all times considerably above the average of artisans' wages. The handkerchief which is tied loosely round the mouth of the needle-pointer is a poor safeguard. The steel and gritty particles enter his lungs in abundance; and he is still, what he has ever been, a short-lived and ill-conditioned man. It excites regret to see (as any may see, without much difficulty), in the Museum of the Society of Arts, the models of Mr. Abraham's inventions, memorials only of the unwillingness on the part of the workman to adopt a plan which is intended for his own benefit, which is looked on favourably by his employers, which society sanctions by its approval, which would give him better health and a longer life, and which would raise him in the scale of respectability as a man.

We have dwelt somewhat at length on the process of needle-pointing, because it involves matters of more than usual interest in connection with the well-being of those who are employed in it; but we may now resume the thread of detail.

The reader will bear in mind that the state of our embryo needle is simply that of a piece of dull straight wire, about three inches long (supposing '6's' to be the size), and pointed at both ends. The next process is one of a series by which two eyes or holes are pierced through the wire, near the centre of its length, to form the eyes of the two needles which are to be fashioned from the piece of wire. A number of very curious operations are connected with this process, involving mechanical and manipulative arrangements of great nicety. Those who are learned in the qualities of needles—as that they will not 'cut in the eye,' and so forth—will be prepared to expect that much delicate workmanship is involved in the production of the eyes, and they will not be in error in so supposing. Most of the improvements which have from time to time been introduced in needle-making relate more or less to the production of the eye. In the commoner kinds of needles many processes are omitted which are essential to the production of the finer qualities; but it will show the whole nature of the operations better for us to take the case of those which involve all the various processes.

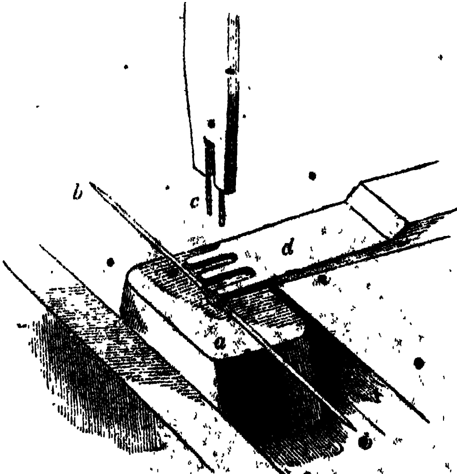
After being examined when the pointer has done his portion of the work to them (an examination which is undergone after every single process throughout the manufacture), the wires are taken to the 'stamping-shop,' where the first germ of an eye is given to each half of every wire. The stamping-machine consists of a heavy block of stone, supporting on its upper surface a bed of iron; and on this bed is placed the under half of a die or stamp. Above this is suspended a hammer, weighing about thirty pounds, which has on its lower surface the other half of the die or impress. The hammer is governed by a lever moved by the foot; so that it can be brought down exactly upon the iron bed. The form of the die or stamp may be best explained by stating the work which it is to perform. It is to produce the 'gutter,' or channel, in which the eye of a needle is situated, and which is to guide the thread in the process of threading a needle.

But besides the two channels or gutters, the stampers make a perforation partly through the needle, as a means of marking exactly where the eye is to be. The device on the two halves of the die is consequently a raised one, since it is to produce depressions in the wire. The workman, holding in his hand several wires, drops one at a time on the bed-iron of the ma-



chine, adjusts it to the die, brings down the upper die upon it by the action of the foot, and allows it to fall into a little dish when done. This he does with such rapidity that one stamper can stamp four thousand wires, equivalent to eight thousand needles, in an hour, although he has to adjust each needle separately to the die.

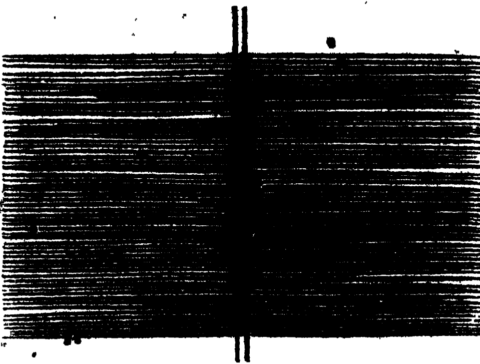
To this process succeeds another, in which the eye of the needle is pierced through. This is effected by boys, each of whom works at a small hand-press; and the operation is at once a minute and ingenious one. The boy takes up a number of needles or wires, and spreads them out like a fan. He lays them flat on a small iron bed or slab, holding one end of each wire in his left hand, and bringing the middle of the wire to the middle of the press. To the upper arm of the press are affixed two hardened steel points or cutters, being in size and shape exactly corresponding with the 'eyes' which they are to form. Both of these points are to pass through each wire, very nearly together, and at a small distance on either side of the exact centre of the wire. The wire being placed beneath the points, the press is moved by hand, the points descend, and two little bits of steel are cut out of the wire, thereby forming the eyes for two needles. As each wire becomes thus pierced, the boy shifts the fan-like array of wires until another one comes under the piercers, and so on throughout. The press has to be worked by the right hand for piercing each wire; and the head of the boy is held down pretty closely to his work, in order that he may see to 'eye' the needles properly. Were not the wires previously prepared by the stamper, it would be impossible thus to guide the piercers to the proper point; but this being effected, patience, good eye-sight, and a steady hand effect the rest.



[*a* is the lower die, on which the needles, *b*, are placed, to be pierced by the points, *c*, guided by the apparatus, *d*.]

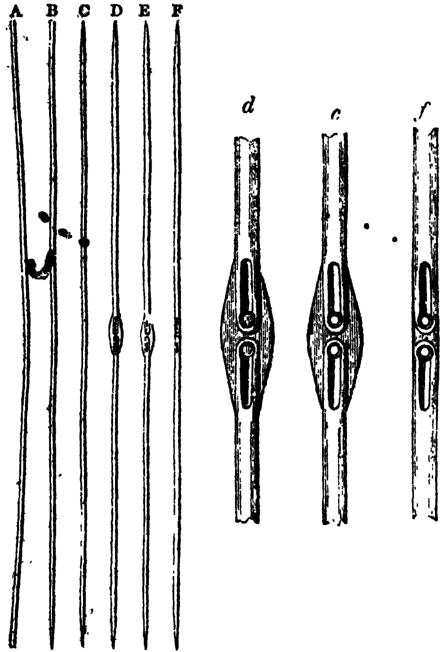
There are several processes about this stage which are effected by boys; groups of little incipient workmen being distributed here and there, each group under the direction of an older hand. Some have hairy caps on, some cloth caps, some aspire to the dignity of a workman's paper cap; here is one with a pinafore, there another who thinks he is man enough to wear an apron; some have eyes as sharp as the needles which they are piercing, while others look as if they would rather be playing at marbles or at 'hop-scotch,' than piercing needles at all: in short, they are true boys, and, we doubt not, as fond of fun as any other boys. Their earnings are from two shillings per week upwards, according to the importance of the work at which they are placed and their skill in executing it. In many cases these are the sons or apprentices of workmen employed in the factory, who receive the earnings of the boys, and are responsible for the work done by them; in other cases the boys receive the wages which they earn.

Some of these little labourers take the needles when they have been 'eyed,' and proceed to 'spit' them; that is, to pass a wire through the eye of every needle. Two pieces of fine wire, perhaps three or four inches in length, are prepared, the diameter corresponding exactly with the size of the needle eye. These two pieces of wire are held in the right hand, parallel, and at a distance apart equal to the distance between the two eyes in each needle-wire. The pierced needles, being held in the left hand, are successively threaded upon the two pieces of smaller wire, till, by the time the whole is filled, the assemblage has something the appearance of a fine-toothed comb. A workman then files down



the bur, or protuberances left on the side of the eye by the stamping.

It must be borne in mind that throughout all these operations the needles are double; that is, that the piece of wire, three inches in length, which is to produce two needles an inch and a half long each, is still whole and undivided, the two eyes being nearly close together in the centre, and the two points being at the ends. Now, however, the separation is to take place. The filer, after he has brought down the protuberances on each wire, but before he has laid the comb of wires out of his hand, bends and works the comb between his hands in a peculiar way, until he has broken the comb into two halves, each half 'spitted' by one of the fine wires. The needles have arrived at something like their destined shape and size; for they are of the proper length, and have eyes and points. In the annexed cut we can trace the wire through the processes of change hitherto undergone.



[A, the wire for two needles; B, the same, pointed at one end; C, pointed at both ends; D, the stamped impress for the eyes; E, the eyes pierced; F, the needles just before separation; *d*, *e*, *f*, enlargements of D, E, F.]

But although we have now little bits of steel, which might by courtesy be called needles, they have very many processes to undergo before they are deemed finished, especially if, in accordance with our previous supposition, they are of the finer quality. There are very many workshops which we have yet to glance through, the first of which is that of the 'soft-straightener.' The 'filer' and his two 'spitters' (who together get ready about four thousand needles in an hour) are very likely to bend in a slight degree the needles under operation; and, indeed, so are likewise the 'stampers' and the 'eye'-makers. To restore the straightness of the wire is the office of the 'soft-straightener,' who is frequently a female. And here we cannot refrain from remarking on the neat and respectable appearance of the females engaged in the needle-manufacture. Their earnings are on an average from eight to twelve shillings a-week (except the youngest girls); and their appearance and general demeanour are creditable both to themselves and to those by whom they are employed. The writer happened to be passing through the main street of Redditch at a

time when the work-people were pouring from the different needle-factories, on their way home to dinner; and an opportunity was thus afforded for observing not only the large number of persons employed in this manner, but also the air of respectability which generally pervaded them,—in which many of the operatives in the 'Great Metropolis' might imitate them with advantage.

The 'soft-straightener' is seated in front of a bench, near the front edge of which is placed a small steel plate. On this plate the needles are placed, parallel or nearly so; the straightener employed is a steel bar, from a foot to half a yard long, an inch or two in width, and perhaps a quarter of an inch thick. It is turned upwards a little at the two ends, so as to be somewhat convex at the lower surface; and is held by both hands at the two ends. By a curious management



of this instrument, the soft-straightener separates each individual needle from the group of which it forms a part, and rolls it over two or three times with the lower surface of the instrument, pressing it against the iron-plate, and thus working out any curvatures or irregularities which may have been given to it by the previous operations. It would seem much more simple to place the needles, one by one, on the iron plate, and roll them with the bar of metal till straightened: but a great expenditure of time would result from such a plan. As it is, the heap of needles is placed parallel on the iron plate, and by a slight touch each one is separated from its fellows, straightened, and passed into a tray beneath. So quickly is this done, that three thousand needles can be thus straightened in an hour by one person.

The needles are by this time pointed, eyed, and straightened; but before they can be brought to that beautifully finished state with which we are all familiar, it is necessary that they should be 'hardened' and 'tempered' by a peculiar application of heat. After being examined, to see that the preceding processes are fitly performed, the needles are taken to a shop provided with ovens or furnaces. They are laid down on a bench, and by means of two trowel-like instruments, spread in regular thick layers on narrow plates or trays of iron. In this way they are placed on a shelf or grating in a heated furnace. When the proper degree of heating has been effected, the door is opened, and the needles are shifted from the iron tray into a sort of colander or perforated vessel immersed in cold water or oil. When they are quite cooled, the hardening is completed; and if it has been effected in water, the needles are simply dried; but if in oil, they are well washed in an alkaline liquor to free them from the oil. Then ensues the tempering processes. The needles are placed on an iron plate, heated from beneath, and moved about with two little trowels until every needle has been gradually brought to a certain desired temperature.

We now leave the furnace-room and proceed to one of the upper rooms of the factory, where a multitude of minor operations are conducted incident to the finishing of the needles. Notwithstanding the 'soft-straightening' which the needles underwent after they were pointed and eyed, they have become slightly distorted in shape by the action of the heat in the processes just described, and to rectify this they undergo the operation of 'hammer-straightening.' A number of females are seen seated at a long bench, each with a tiny hammer, giving a number of light blows to the needles; the needles being placed on a small steel block with a very smooth upper surface. This is rather a tedious part of the manufacture, the workwoman not being able to straighten more than five hundred needles in an hour, a degree of quickness much less than that which we have had hitherto to notice.

We leave the tinkling hammers and follow the needles to the only part of the manufacture which involves apparatus other than of a very small size. This is the 'scouring' process. In one of the lower rooms of the factory are twelve machines, looking like mangles, or perhaps more correctly, like marble polishing-machines,—a square slab or rubber working to and fro on a long bed, stone, or bench. The object of this process is to rub the needles one against another for a very long period, till the surfaces of all have become perfectly smooth, clean, and true. This is effected in a curious manner. A strip of very thick canvas is laid out open on a bench, and on this a large heap of needles, amounting to perhaps twenty or thirty thousand, is laid, all the needles being parallel one with another, and with the length of the cloth. The needles are then slightly coated with a mixture of emery and oil, and tied up tightly in the canvas, the whole forming a compact roll about two feet long and two inches in thickness. Twenty-four rolls of needles being thus prepared, comprising probably six hundred thousand needles in all, they are placed under the rubbers of the scouring-machines, two rolls to each machine. A steam-engine (most of the Redditch factories, we believe, have water-wheels) then gives to the rubbers, by connected mechanism, a reciprocating or backward and forward motion, pressing heavily on the rolls of needles, and causing all the needles of each bundle to roll one over another. By this action an intense degree of friction is exerted among the needles, whereby each one is rubbed smooth by those which surround it. For eight hours uninterruptedly this rubbing or scouring is carried on; after which the needles are taken out, washed in suds, placed in new pieces of canvas, touched with a new portion of emery and oil, and subjected to another eight-hours' friction. Again and again is this repeated, insomuch that for the very finest needles the process is performed five or six times over, each time during eight hours' continuance. This is one of the points in which the difference is shown between various qualities of needles, the length of the scouring being correspondent with the excellence of the production. The pieces of canvas become

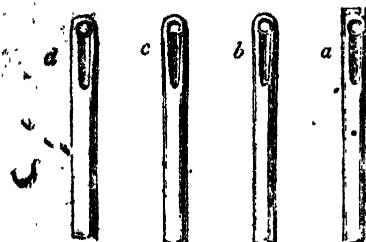
coated within with a mixture of emery, oil, and steel; but the quantity of steel rubbed off in this process is not so much as might at first be supposed.

Again we accompany the needles to another part of the factory, being that which is technically termed the 'bright-shop,' in which many processes are carried on in reference to the finishing of the needles. The needles are examined after being scoured, and are placed in a small tin tray, where, by shaking and vibrating in a curious manner, they are all brought into parallel arrangement. From thence they are removed into flat paper-trays, in long rows or heaps, and passed on to the 'header,' generally a little girl, whose office is 'to turn all the heads one way and all the points the other.' This is one among the many simple but curious processes involved in this very curious manufacture, which surprise us by the rapidity and neatness of execution. The girl sits with her face towards the window, and has the needles ranged in a row or layer before her, the needles being parallel with the window. She draws out laterally to the right those which have their eyes on the right hand, into one heap; and to the left those which have their eyes in that direction, in another.

About this time too the needles are examined one by one, to remove those which have been broken or injured in the long process of scouring; for it sometimes happens that as many as eight or ten thousand, out of fifty thousand, are spoiled during this operation. Most ladies are conversant with the merits of 'drilled-eyed needles,' warranted "not to cut the thread." These are produced by a modern improvement, whereby the eye, produced by the stamping and piercing processes before described, is drilled with a very fine instrument, by which its margin becomes as perfectly smooth and brilliant as any other part of the needle. To effect this the needle is first 'blued,' that is, the head is heated so as to give it the proper temper for working. Then the eye is 'counter-sunk,' which consists in bevilling off the eye by means of a kind of triangular drill, so that there may be no sharp edge between the eye itself and the cylindrical shaft of the needle. Next comes the drilling. Seated at a long bench are a number of men and boys, with small drills working horizontally with great rapidity. The workman takes up a few needles between the finger and thumb of his left hand, spreads them out like a fan with the eyes uppermost, brings them one at a time opposite the point of the drill, governs the handle or lever of the drill with his right hand, and drills the eye, which is equivalent to making it circular, even, smooth, and polished. He shifts the thumb and finger round, so as to bring all the needles in succession under the action of the drill; and he thus gets through his work with much rapidity. The preparation of the drills, which are small wires of polished steel three or four inches long, is a matter of very great nicety, and on it depends much of that beauty of production which constitutes the pride of a modern needle-manufacturer.

We next pass into a large room, where a multitude of little wheels are revolving with great rapidity, some intended for what is termed 'grinding' the needles, and some for polishing. The men are seated on low stools, each in front of a revolving wheel, which is at a height of perhaps two feet from the ground. All the wheels are connected by straps and bands with a steam-engine in the lower part of the factory. A constant humming noise is heard in the room, arising from the great rapidity of revolution among a number of wheels; and it is not difficult for the ear to detect a difference of tone or pitch among the associated sounds, due to differences in the rate of movement. The grinding-wheels are very small, not above five or six inches in diameter: they are made of gritstone, and are attached to a horizontal axis. The grinding here alluded to is not such as might be supposed, relating to the *points* of the needles, but has reference simply to the *heads*, which have not yet had a rounded form given to them. The workman takes up a layer or row of needles between the fingers and thumbs of the two hands, and applies the heads to the stones in such a manner as to grind down any small asperities on the surface. As the small grindstones are revolving three thousand times in a minute, it is plain that the steel may soon be sufficiently worn away by a slight contact with the periphery of the stone.

The grinders and the polishers sit near together, so that the latter take up the series of operations as soon as the former have finished. The polishing-wheels consist of wood coated with buff leather, whose surface is slightly touched with polishing paste. Against these wheels the polishers hold the needles, applying every part of the cylindrical surface in succession; first holding them by the pointed end, and then by the eye end. About a thousand in an hour can thus be polished by each man; and when they leave his hands the needles are finished. A magnified representation of the eye in different states will assist these details.



[*a*, a needle with the eye and head rough; *b*, the head filed and formed; *c*, the eye countersunk; *d*, drilled and finished.]

We have still to see the needles papered. In one of the rooms a number of females are cutting the papers, separating the needles into groups of twenty-five each, and folding them in the neat oblong form so well known to all the users of a 'paper of needles.' So expert does practice render the workwoman, that each one can count and paper three thousand needles in an hour. The papered needles then pass to another room, where boys paste on the smart-looking labels which deck every paper of needles. Even here there are sundry little contrivances for expediting the process, which would scarcely be looked for by common observers. When the papers have been dried on an iron frame in a warm room, they are packed into bundles of twenty papers each; which are further packed in square parcels containing ten, twenty, or fifty thousand needles, enclosed, if for exportation, in soldered tin cases. As a means of judging the bulk of the needles, we may state that ten thousand '6's' form a packet about six inches long, three and a half wide, and under two in thickness.

Thus have we followed the manufacture to its close. None but the finest needles undergo the whole of the processes enumerated; but we have wished to give them as a means of estimating the complexity of the manufacture of an article apparently so humble. The arrangements of the factory, as to apparatus, &c., are adapted to the production of a hundred millions of fine needles per annum. As to the whole quantity made in the Redditch factories and in the houses of the workmen in the vicinity, it has been estimated at so high a number as seventy millions per week! These are startling results, and show that in considering the seats of manufacture in England, we must not forget to include the remarkable Worcestershire village of Redditch.



[A Brahmen expounding the Veda.]

THE CASTES AND TRIBES OF INDIA.

No. II.

The Hindu account of the institution of castes has already been given (No. 692), and it will be recollected that only four pure castes are recognised, the Brahmen or priests, the Cshatriyas, who are soldiers, the Vaisyas as husbandmen, and the Sudras as servants or labourers. Heeren supposed that the first three were a foreign race, who subdued the aborigines of the country, and reduced them to an inferior caste. These four classes constitute the elements of every society in an early period of civilization. In England during the Anglo-Saxon period the people would be found divided into the same number of classes, but then the distinction was not hereditary. Plato ascribed the origin of political association and laws to the division of labour. From this cause, he says, men are obliged to associate, one man affording one accommodation, another another, and all exchanging the accommodations which each can provide, for the different accommodations provided by the rest. Herodotus and Strabo state that the Colchians and Iberians were divided into four classes whose rank and office were hereditary and unchangeable. The Levites were an hereditary priesthood. Mr. Mill, in his 'History of British India,' proves that amongst the Peruvians, the Medes, the Athenians, and other people in very early periods of history, the distinction of castes or classes existed. The institution of castes marks a more advanced stage of society than that which is constituted of families only; and it is a step not yet reached by the Arabs of the desert, or the roaming Tartars of the great plains of Asia. We may here remark that we have borrowed the word 'caste' from the Portuguese word 'casta,' which signifies a lineage or race.

Professor Wilson says, that every thing in the Hindu Institutes indicates that the Brahmens originated not from political but religious principles. "Apparently," he says, the system "was contrived by a religious confederation, as the scheme best adapted to introduce order amongst semi-civilized tribes, and with no view to their own advantage or aggrandizement, or enjoyment of indolent ease. The authority of influence, of advice, the Brahmens necessarily retained, and they were the only competent expounders of the laws which they promulgated. They had no other means of protection than the character of sanctity with which they invested themselves, and which was equally necessary to insure attention to their instructions. They laboured to deserve the opinion of sanctity by imposing burdensome duties on themselves of a domestic and religious character."

In the very rudest constitution of society the priest is

to be found. In addition to the influence which he professes to have with good and evil spirits, he sometimes practises the medical art, and in various ways sustains his importance by superior cunning, working upon the superstition, ignorance, and fears of man in his most abject condition. Nowhere has the influence of a priesthood been so paramount and extensive as in Hindostan. It is remarkable that the Brahmens never invested themselves with royal authority; but Professor Wilson observes that this probably proceeded from motives of prudence and policy, as well as from a feeling of true contemplative devotion, by which especially they retained their hold on the people. But then, as Mr. Mill shows, their power was really greater than that of the sovereign. The laws of Menu direct that "To one learned Brahmen, distinguished among the rest, let the king impart his momentous counsel." As the sole interpreter of the laws, they in reality possessed the judicial powers of government as well as those of a legislative character. The code was already perfect and complete, as coming from the Divine Being, and in no case could it be interpreted except in the sense the Brahmens were pleased to impose. The king was little more than a servant of the Brahmens. In order to have an adequate idea of the superiority of the ancient Brahmen, we must refer to the laws of Menu, which were probably promulgated three thousand years ago. While the Sudra, the lowest of the four castes, are represented as proceeding from the foot of the Creator, the Brahmen came forth from his mouth. He is declared to be the lord of all the classes, and from his high birth alone is an object of veneration even to deities, and it is through him and at his intercession that blessings are bestowed upon mankind. "When a Brahmen springs to light, he is born above the world, the chief of all creatures." The first duty of civil magistrates is to honour the Brahmens. "Whatever exists in the universe is all in effect, though not in form, the wealth of the Brahmen, since the Brahmen is entitled to it all by his primogeniture and eminence of birth." The sacred books are exclusively his; and while the other classes are scarcely permitted to read them, he is appointed their sole expounder. For offering to give instruction to Brahmens, hot oil must be poured into the offender's mouth and ears, and for contumelious language the punishment is almost as severe. Mysterious powers were assigned to them. "A priest who well knows the law needs not complain to the king of any grievous injury, since, even by his own power, he may chastise those who injure him: his own power is mightier than the royal power." Again, it is said: "Let not the king provoke Brahmens to anger, for they, once enraged, could immediately destroy him;" and it is asked, "What man, desirous of life, would injure those by the aid of whom worlds and gods perpetually subsist, those who are rich in the knowledge of the Veda?" Extraordinary respect must be paid to the most humble Brahmen:—"A Brahmen, whether learned or ignorant, is a powerful divinity." Thus, though Brahmens employ themselves in all sorts of mean occupations, they must invariably be honoured, for they are something transcendently divine." The meanest Brahmen would be polluted by eating with the king, and death itself would be preferred to the degradation of allowing his daughter to be married to him. The worst crimes scarcely subjected them to punishment, though in other classes they were visited with cruel severity. "Neither shall the king," says one of the admirers of Menu, "slay a Brahmen, though convicted of all possible crimes." To confer gifts upon Brahmens was an essential religious duty. These gifts were a necessary part of expiation and sacrifice. The noviciates to the priestly office derived their subsistence from begging. Possessing all the realities of supreme power in the state, the Brahmens were, if possible, to a still greater extent the masters of private life. The Hindu ritual, as Mr. Mill remarks, extended to almost every hour of the day, and every function of nature and society; and consequently, those who were the sole judges and directors of its complicated and endless duties could not but be possessed of an enormous influence on the mental character of the people.

To the above extracts from authentic texts we must append the following important note from Professor Wilson's new edition of Mill's 'History of British India,' in which he observes that these texts are nevertheless calculated to give 'wrong impressions.' He says:—"The Brahmens are not priests in the ordinary acceptation of the term, nor have they, as Brahmens only, such influence in society as is here ascribed to them. The Brahmens, in the early stages of Hindu society, were an order of men who followed a course of religious study and practice during the first half of their lives, and spent the other in a condition of self-denial and mendicity. They conducted for themselves, and others of the two next castes, sacrifices, and occasionally great public ceremonials; but they never, like the priests of other Pagan nations, or those of the Jews, conducted public worship, worship for individuals indiscriminately, worship in temples, or offerings to idols. * * * The whole tenor of the rules for the conduct of a Brahmen is to exclude him from everything like worldly enjoyment, from riches, and from temporal power.' Neither did the Brahmens, like the priests of the Egyptians, keep to themselves a monopoly of spiritual knowledge. The Brahmen alone, it is true, is to teach the Vedas; but the two next orders are equally to study them, and were, therefore, equally well acquainted with the law and the religion. Even the Sudra was, under some circumstances, permitted to read and teach. In modern times the Brahmens, collectively, have lost all claim to the characters of a priesthood. They form a nation, following all kinds of secular avocations. And when they are met with in a religious capacity, it is not as Brahmens merely, but as being the ministers of temples, or the family 'gurus,' or priests of the lower classes of the people, offices by no means restricted, though not unfrequently extended to the Brahmenical caste, and, agreeably to the primitive system, virtually destructive of Brahmenhood."

RESINOUS PRODUCTS OF THE PINE AND FIR.

There is a singular variety in the resinous products of the pine and fir, according to the species from which they are obtained, and the mode of obtaining them. Some result from a simple incision in the trunk of the living tree; some require a process of heat to obtain them; some are solid, some liquid. The best mode of viewing the matter will be perhaps to take in succession the species which yield the best-known resinous products.

The best *turpentine*, viz., that of Chio or Cyprus, and which gives name to all the other kinds, is not the growth of the pine or fir genus; but all the other kinds, such as Venice turpentine, Strasburg turpentine, and the common turpentine, are produced from this genus. All turpentines are produced by making incisions in the living tree, from which a kind of juice flows out. The Strasburg turpentine is a kind which is produced from the silver fir; and Mr. Loudon's account of the mode adopted by the Italian peasants in collecting it will well illustrate the general way of procuring turpentine.

At about the month of August in every year the peasants proceed towards the fir-forests on the Alps.

They carry in their hands sharp-pointed pouches called 'cornets,' and tin vessels suspended from girdles round the waist. Thus accoutred, they climb to the summits of the loftiest fir-trees; their shoes being armed with cramping-irons, like spurs, which enter into the bark of the tree, and thus support the wearer. The resinous fluid is contained in small tumours or blisters, under the epidermis of the bark; and the peasant, clinging to the trunk of the tree with his knees and one arm, presses the sharp extremity of his cornet against the little tumours. An incision being thus made, the cornet is soon filled with the clear turpentine which flows from the blister. The man then empties the treasure into the tin bottle slung to his waist; and proceeds to another tumour in a similar manner. When the bottle is full, the turpentine is strained into a large leather or goatskin bottle. This straining is to free the turpentine from the leaves, or moss, and bits of bark which may have fallen into the bottle; and this is the only preparation that is given to this kind of turpentine, which is kept in the skin or leathern bottles for sale. Good Strasburg turpentine ought to be clear, free from impurities, transparent, and of the consistence of syrup, with a strong resinous smell and rather a bitter taste. It is employed, as well as the essential oil of turpentine distilled from it, both in medicine and in the arts. The essential oil is distilled with water from the turpentine, and there is left remaining a solid residue which constitutes black resin.

The larch, which forms a particular kind of the coniferæ, is the tree which yields the 'Venice turpentine' sold in the shops. Unlike the Strasburg turpentine, this product is obtained from incisions in the trees themselves, instead of from tumours or excrescences on the upper branches. When the sap of a vigorous larch begins to be in motion in the spring, drops of turpentine are often seen exuding from the bark; and if the trunk were split, it would in such case be found to contain several deposits of liquid resin, at eight or ten inches depth within the bark. It is in the mountain-valleys between France and Savoy that this kind of turpentine is principally collected. The peasants of the valley of St. Martin, in the Pays de Vaud, use augers nearly an inch in diameter, with which they pierce the full-grown larches in different places, beginning at a height of three or four feet from the ground, and mounting gradually to ten or twelve feet. They choose, generally, the south side of the tree, and, where practicable, the knots formed by branches which have been broken or cut off, and through which the turpentine easily exudes. The holes are always made in a slanting direction, in order that the turpentine may flow out of them more readily; and care is always taken not to penetrate to the centre of the tree. To the holes thus bored are fixed gutters made of larch wood, an inch or two in width, and about half a yard long. One of the ends of each gutter terminates in a peg, through the centre of which a hole is bored, half an inch in diameter. This end of the gutter is forced into the hole made in the tree, and the other end is led into a small bucket or trough, which receives the turpentine. A very picturesque appearance is presented in a larch forest, in fine spring weather, by the vast number of little buckets at the foot of the trees, each attached to a tree by a slender tube or gutter, through which the clear limpid turpentine, glittering in the sun, trickles down into the bucket; while every morning and evening the peasants hasten from tree to tree, examining their buckets, taking away or emptying those that are full, and replacing them with empty ones. This scene continues from May to September, during which a full-grown larch will yield about seven or eight pounds of turpentine, which requires no other preparation to render it fit for sale than straining it through a coarse hair-cloth to free it from impurities. If it happens that turpentine does not flow from a hole, the hole is stopped with a peg, and not re-opened for two or three weeks; after which the turpentine is found to have collected in considerable quantity. The Venice turpentine thus obtained is clear, transparent, of the consistence of a thick syrup, with a bitter taste and a strong disagreeable smell. It is employed in making varnishes, in veterinary surgery, and in various departments of medicine.

The common turpentine, yielded by the Carolina pine, is procured in a way somewhat different from either of the above. In the month of January or February cavities are made in the trees, at a few inches from the ground; these are incisions or notches, generally of a sufficient size to hold about three pints of sap, but proportioned to the size of the tree. When these cavities, which in America are called 'boxes,' are made, the ground is raked, or cleared from leaves or herbage. The 'boxes' are intended to receive the turpentine or sap of the tree, which generally begins to flow about the month of March, and becomes very abundant as the weather gets warmer. In order to conduct the sap into the 'boxes,' a notch is made in the tree in the month of March, with two oblique gutters to conduct the flowing sap. In about a fortnight the box becomes full, and a wooden shovel is used to transfer its contents to a pail, by means of which it is conveyed to a large cask placed at a convenient distance. The edges of the wound are chipped every week; and each box becomes filled in about three weeks. Long continued rains check the flow of the sap, and even cause the wounds to close; and for this reason very little turpentine is procured in cold damp seasons. The turpentine which solidifies around the edges of the incision is sold as an inferior kind, and a mixture of the two kinds, known as Boston turpentine, is used in the soap manufacture.

Burgundy pitch constitutes another variety of the sap of the coniferæ. This is obtained from the spruce fir. The Burgundy pitch of the shops is the sap of the spruce fir, clarified by boiling in water: hence its production embraces the collecting and the clarifying. In the early part of spring a vertical strip of bark, three feet high by an inch or two in width, is cut from the south side of each tree, as deep as, but without wounding, the soft wood, since it is between this soft wood and the bark that the sap flows. The lower part of the incision is at about two feet from the ground, and is cut inward so as to form a kind of cell or recess. As soon as the sap is in motion, the sides of this groove begin to be slowly filled with it; and when filled, the contents are scraped out with a hook-bladed knife. The resin (or it may more properly be called so than pitch or turpentine) is put into a conical basket or scuttle made of the bark, and kept till wanted for manufacturing.

In order to bring this resinous sap into the commercial form of Burgundy pitch, the peasants in the south of France prepare large cauldrons, into which a little water is poured. The resin is gradually added to the water, till the cauldron is four-fifths filled. A gentle fire is then lighted below, which is gradually augmented till the water boils, and the resin is all melted. The contents of the cauldron are next poured into a bag made of coarse linen, which has been previously wetted, and subjected to slight pressure. The resin flows pure and clear into small casks made of fir-wood; and in this state it is the yellow Burgundy pitch sold in our shops. In general, one hundred pounds of resin, as collected from the tree, yield fifty pounds of Burgundy pitch. Trees grown in fertile soils are said to

yield a greater proportion of resin than those grown in poor soils; and the pitch is of better quality when the resin has been collected in a hot dry summer, than in a cold and humid one. A strong and vigorous spruce fir will yield, every second year, from forty to fifty pounds of congealed resin; and this may be collected for twenty or thirty years, if no value be set on the tree except for its resin; else it must be cut down sooner, for it is found that the wood of a tree becomes much deteriorated after the sap has been drawn from it.

Thus it will be seen that all these resinous products are obtained by making incisions in the living tree. The common resin of the shops, however, is not exactly a natural exudation, for it is the solid residue obtained by distilling common turpentine. Turpentine consists, in fact, of two substances—an essential oil and resin; and the process which yields the essential oil at the same time yields the resin. When the turpentine is distilled, the oil comes over, and the resin is left behind: if the distillation is continued to dryness, the residue is 'black resin;' but when water is mixed with the turpentine while yet fluid, and incorporated with it by agitation, the solid residue of the distillation is 'yellow resin.'

Besides the resinous products obtained from the living tree, there are others of a peculiar kind obtained from it after it is cut down. These are *tar*, *pitch*, and *lampblack*. All the tar of the southern states of America is made from the dead wood of the Carolina pine; consisting of the trees which have fallen from natural decay, or from hurricanes, or fires, of the summits of those which are felled for timber, and of limbs broken off by the ice that sometimes overloads the trees. When a pine tree is dead, the sap-wood decays, but the heart-wood becomes surcharged with resinous juice, which is productive of tar at any period for many years after the vitality of the tree has ceased.

The mode of preparing tar from this tree in America is as follows:—a kiln is formed in a part of the forest abounding in dead wood. The wood is collected, stripped of the sap-wood, and cut into billets two or three feet in length and about three inches thick, a task which is rendered tedious and difficult by the numerous knots with which the wood abounds. The next step is to prepare a place for piling the billets, and for this purpose a circular mound is raised, slightly declining from the circumference to the centre, and surrounded by a shallow ditch. The diameter of the pile is proportioned to the quantity of wood which it is to receive, and in the middle is a hole, with a conduit leading to the ditch, in which is formed a receptacle for the tar as it flows out. Upon the surface of the mound, after it has been beaten hard and coated with clay, the wood is laid radially round in a circle. The pile, when finished, may be compared to a truncated cone, ten or twelve feet high, and from twenty to thirty in diameter. The pile is strewed over with pine leaves, covered with earth, and held together at the sides by a slight band. A fire is then kindled, not at the bottom of the pile, for the whole mass would soon be rapidly ignited, and the tar would be consumed instead of distilled—but at the top, whence the fire penetrates slowly downwards towards the bottom with a slow and gradual combustion. It is to retard the rapidity of combustion that the covering of earth is laid on the pile. As the wood consumes, the tar flows from it, and by the end of eight or nine days a hundred barrels of tar may have flowed into the ditch, from which it is emptied into pine casks containing thirty gallons each.

In Scotland tar is sometimes extracted from the roots of the Scotch pine, in a rude manner, for local purposes. The country-people having hewn the wood into billets, put them into a pit dug in the earth. When the billets are ignited, a black thick matter runs from them, which falls to the bottom of the pit, and constitutes tar. The top of the pit is covered with tiles, to keep in the heat, and there is at the bottom a little trough out of which the tar runs like oil.

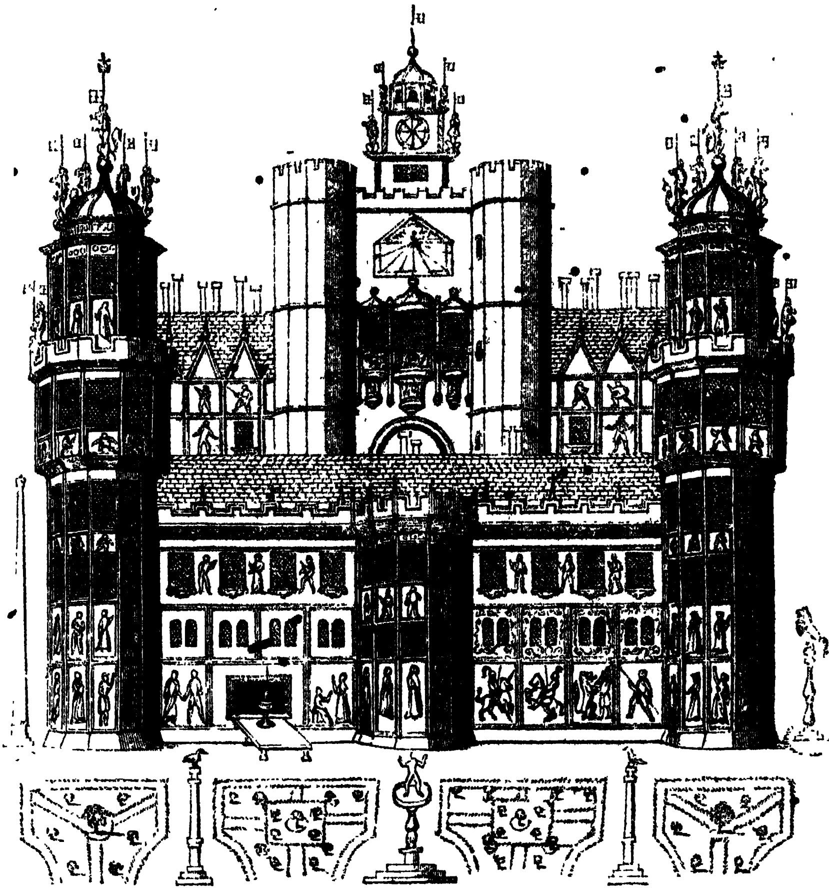
It is, however, from Sweden and Russia that the main supply of tar is obtained. The species of pine which yields tar in the greatest abundance is there plentiful. Mr. M'Culloch states that more than a hundred thousand barrels of tar were imported from Russia and Sweden in 1831. The Swedish process of tar-making has been described, and illustrated by a wood-cut, in our No. 247.

Pitch bears nearly the same relation to tar that resin does to turpentine: it is the solid residue obtained by evaporating or distilling tar, and is obtained in various ways, according to the nature of the pine or fir whence it is procured.

Lampblack is the *soot* of burned tar. In France they have lampblack-furnaces, in which a chimney carries off the smoke from a fireplace into a chamber which has an opening in the roof. Over the opening is placed a flannel bag, supported by rods of wood, in the form of a pyramid, and composed of four pieces of coarse flannel sewed together. The best lampblack is made by burning straw through which tar has been strained. The straw and tarry refuse are put into the stove, and kindled. The smoke passes from the stove through the chimney into the chamber, where it deposits its soot on the walls and on the flannel bag; the soot is detached by striking the outside smartly with a stick. The flannel pyramid acts as a filter to the lighter part of the smoke, retaining the soot, and permitting the heated air to escape into the atmosphere. The door of the chamber is then opened, and the lampblack, being swept out, is packed in small barrels made of the wood of the spruce fir, for sale. Lampblack seems to have acquired its name from a mode of producing it sometimes adopted in France. Black resin is, in such cases, burned in a kind of lamp, having a tin tube attached by way of chimney; the end of the tube is fixed in a close box, having an opening in the top surmounted by a flannel cone.

It will thus be seen that—disregarding the common commercial names applied to the substances—the resinous products of the pine and fir may be classed as of five kinds: viz., the *turpentine*, or juice of the living tree; the *resin*, or solid residue obtained from the turpentine; the *tar*, or juice of the dead tree; the *pitch*, or residue of the tar; and the *lampblack*, or soot obtained by burning any of these.

A Spanish Diligence.—The staff consists of a *mayoral*, or conductor; of a *zagal*, or aid, who sit together on a not very elevated seat; of a postboy, and a *sbirro*, which last sits behind. In summer these all wear the genuine Andalusian costume; but at the present moment, covered as they are with sheepskins, they look exactly like so many Robinson Crusoes. The team consists of *thirteen mules*, all bearing *noms de guerre*, which they will retain to their death: they are all close shaved; and the inexorable scissors of the gitano, which pass all over their bodies twice a year, have left untouched only the end of the tail, at the root of which are left two tufts of hair, looking exactly like mustaches growing at the wrong end. This practice of shaving the mules must tend certainly to their comfort during the intense heat of summer, but in the cold and wet months of December, January, and February, it is far otherwise. The mules are harnessed two and two, save the leader, on which the postboy sits: the only reins are attached to the wheelers; and the mules, ten in number, between the wheelers and the leader, are as independent as a tribe of Bedouins: habit only keeps them in their place.—*Dembowski's Two Years in Spain and Portugal; from the Foreign Quarterly Review.*



[Nonsuch House.—From Speed's 'Theatre of Great Britain']

PROGRESSES OF QUEEN ELIZABETH.

In the years 1559, 1560, and 1561, the Queen's Progresses were not marked by any peculiar splendour. In 1559 she visited Kent and Surrey. In June and July she was at Greenwich, where, on the 1st of July, the citizens of London entertained her with a "muster," to her "great satisfaction:" fourteen hundred men at arms marched out of London, "in coats of velvet, and chains of gold, with guns, morris pikes, halberds, and flags." The citizens do not appear to have been precipitate in their movements. The first day they proceeded to the "Duke of Suffolk's park in Southwark; where they all mustered before the Lord Mayor, and lay abroad in St. George's Fields all night. The next morning they removed towards Greenwich, to the court there, and thence to Greenwich Park." Here they were reviewed by the Queen and some other attendant nobles; and were drawn up in battle array against each other, giving "three onsets in every battle." In the record of the "charge for the dinners" are some curious items: 6*s.* 10*d.* are paid for three quarters and two necks of mutton to bake venison-wise. (Were the citizens to be thus deceived?); 1*s.* for a pint of rose-water (an indication of their refined luxury, though it was certainly not used for the fingers); 5*s.* for twenty pounds of cherries (a large price, but the growth had not been long introduced); and 1*s.* 1*d.* for water to the water-bearer (a striking proof of the defective arrangements for domestic convenience, when a palace like Greenwich depended for its water upon water-bearers, even though, as is probable, the supply was from some favourite spring for drinking purposes). Fourteen capons cost 24*s.* 8*d.* and fifty eggs 3*s.* 6*d.*, while nine geese were only 10*s.* 2*d.*, and six gallons and a quart of Gascon wine, 8*s.* 4*d.*

These military shows and exercises were greatly encouraged by the Queen, it being her policy, as well as her pleasure, "to accustom her nobles and subjects to arms." A banqueting-house made with fir-poles, and decked with birch branches, and all manner of flowers, both of the field and garden, as roses, gilliflowers, lavender, marygolds, and all manner of strewing herbs and rushes," was erected in the park, and on the 10th July there was exhibited running with spears, after which was "a mask, then a great banquet, and then followed great casting of fire, and shooting of guns till twelve o'clock at night."

This same year she visited Cobham Hall, the seat of Lord Cobham, now that of the Earl of Darnley. She next proceeded to Eltham, "one of the ancient houses of the kings;" and thence to "another of her houses," Nonsuch, of which the Earl of Arundel was then keeper, and who received her on Sunday, August 5, with banquets, a mask, and "the warlike sounds of drums and flutes, and all sorts of music, till midnight;" on Monday night was a "play of the children of Paul's, with their master Sebastian," and at the conclusion of the entertainment "the Earl presented her Majesty with a cupboard of plate."

Nonsuch had been built by Henry VIII. near Cheam in Surrey, and was described by both English and foreign writers as a building upon which "one might imagine everything that architecture can perform to have been employed." Henry had been fond of building, and displayed much magnificence in the construction, reparation, or completion of his palaces; but, of at least ten, Hampton Court is the only one remaining in anything like its original state. Nonsuch has totally disappeared, but several representations have survived, from which, though more fanciful than correct in the requisites of drawing, proportion, and perspective, its elements may be very clearly understood. Our engraving from one of these exhibits a part of the palace towards the garden, the interior court and gateway being seen over the roof. Like some other sumptuous edifices of the period, it was partly of timber. The relievos with which it was so abundantly decorated were of plaster; and from the description of Hentzner,* a German, who visited England in the reign of Elizabeth, we may infer that not only were they of Italian workmanship, but that some might even be after the antique. Of the interior we have unfortunately no account.

"The palace itself," says Hentzner, "is so encompassed with parks full of deer, delicious gardens, groves ornamented with trellice-work, cabinets of verdure, and walks so embowered by trees, that it seems to be a place pitched upon by Pleasure herself to dwell in along with Health. In the pleasure and artificial gardens are many columns and pyramids of marble; two fountains that spout water one round the other like a pyramid, upon which are perched small birds that stream water out of their bills: in the grove of Diana is a very agreeable fountain with Actæon turned into a stag as he was sprinkled by the goddess and her nymphs, with inscriptions. There is besides another pyramid of marble, with concealed pipes, which spirt upon all who come within their reach." "There is scarce an unnatural and sumptuous impropriety at Versailles," says Horace Walpole, speaking of this magnificent though false taste, "which we do not find in Hentzner's description" of these gardens.†

The Queen left Nonsuch for Hampton on the 10th of August, visited the "Lord Admiral's place," on the 17th, and then returned to Whitehall for the remainder of the year.

In 1560 her progresses were unimportant. She left Greenwich in July; visited Parker, the Archbishop of Canterbury, at Lambeth; went thence to Richmond, Oatlands, Sutton, Winchester, and Basing, where the Marquis of Winchester entertained her so splendidly, that the writer of a letter to the Earl of Shrewsbury, given by Lodge, says, that she "openly and merrily bemoaned him to be so old, 'For else, by my troth, if my lord treasurer was a young man, I could find in my heart to have him to my husband before any man in England.'" From Basing she went to Windsor, and here, and in Westminster, finished the year.

In 1561, on the 10th of July, the Queen went from Westminster by water, to the Tower, to visit the Mint, where she "coined certain pieces of gold, and gave them away to those about her." "About five o'clock she went out at the Iron gate, and so over Tower-hill unto Aldgate church, and so down Houndsditch to the Spittle, and down Hog's-lane, and so over the fields to the Charter-House;" a circuitous route, but chosen perhaps for the sake of going "over the fields." At the Charter-House she remained till the 14th; going, however, on the 13th, "by Clerkenwell, over the fields unto the Savoy," to sup with Mr. Secretary Cecil, her Privy Council, and many lords, knights, and ladies, with "great cheer until midnight."

On the day of her departure into Essex the city made a magnificent display; the streets were new gravelled, the houses hung with cloth of gold and silver, arras, rich carpets, &c., and all the companies standing in their liveries from St. Michael le Quern to Aldgate; the lord mayor and aldermen taking their leave of her Majesty at Aldgate. In this progress she visited Lord Rich at Wanstead; the Earl of Oxford at Havering; Sir John Grey at Purgo House, also in Havering parish; Sir Thomas Davey at Loughton Hall; Sir William Petre at Ingatestone; the mansion of New Hall, or Beaulieu, built by her father at Boreham near Chelmsford; and several other private residences. But at Colchester, Harwich, and Ipswich she was received and entertained by the respective corporations. At Harwich she was so well pleased with her reception, that "being attended by the magistrates at her departure as far as the Windmill out of the town, she graciously demanded of them what they had to request of her; from whom she received this answer, 'Nothing, but to wish her Majesty a good journey.' Upon which she, turning her head about, and looking upon the town, said, 'A pretty town: and wants nothing;' and so bade them farewell."* At Ipswich an assessment was made to defray the cost of her entertainment, but she does not appear to have been altogether well pleased at that town, though she remained there from the 6th to the 10th of August. Strype, in his Life of Archbishop Parker, says that "her Majesty took a great dislike at the imprudent behaviour of many of the ministers and readers, there being many weak ones among them, and but little or no order observed in the public service, and few or none wearing the surplice. And the bishop of Norwich himself was thought remiss, and winked at schismatics." From Suffolk, after visiting the Tollemaches, the Waldegraves, and the Morleys, she passed into Hertfordshire, to Standen, the residence of the celebrated Sir Ralph Sadler, and from thence to the town of Hertford. There is no account of this visit in the records of the town, though it is indebted to Elizabeth for a fair and a charter. Here she remained from the 30th of August till the 16th of September, when she took her departure for her own house at Enfield. This house had been bought by Henry VIII. probably as a nursery for his children. Edward VI. when Prince, resided here, and so did Elizabeth. A letter of hers in the British Museum is dated from Enfield, Feb. 14, but the year is omitted; and the dedication of a MS., a translation of an Italian sermon, presented as a new year's gift to her brother Edward and preserved in the Bodleian Library, is dated from Enfield, but again without the year. She seems to have had a partiality for the place, visiting it so late as 1696, when she had "butts set up in the park to shoot at after dinner." On the 22nd Sept., 1561, she "came from Enfield to St. James's beyond Charing Cross. From Islington thither the hedges and ditches were cut down to make the best way for her. There might be ten thousand people met to see her; such was their gladness and affection to her. It was night ere she came over to St. Giles's in the Fields." What a contrast do these few lines present to the present time: "the hedges and ditches between Islington and Charing Cross," and the enormous number of "ten thousand" meeting her, such was their gladness and affection to her." The fields she then crossed are now covered with the dwellings of twenty times the number of that assembled crowed.

* Travels in England, during the reign of Elizabeth, translated by Horace Walpole, 1757.

† A part of the garden, with some of its ornaments, is shown below the elevation of the front of the building in our engraving.

* Dale's 'Harwich.

THE SULPHUR-MINES OF SICILY.

[From the 'Journal of the Statistical Society.']

SULPHUR is found within the limits of a geographical line which commences at the river Maccasoli in the valley of Girgenti, runs northward as far as Lercara in the valley of Palermo, trends eastward to Centorbi in the valley of Catania, and thence runs south-westerly to Terranova in the valley of Caltanizetta, where it terminates. The area of the sulphur-district is about 2600 English square miles. Destitute of timber, and diversified only by fruit-trees scattered around the villages, it has few charms for the passing stranger beyond the fantastic shape of its cliffs and mountains. The man of science, however, who examines its soil, will find it replete throughout with objects of interest. The sulphur territory, the formation of which is tertiary, presents successive strata of shell, limestone, white and blue marl, intermixed with banks or beds of gypsum, and occasional patches of cretaceous matter. The sulphur is found imbedded in the lowest stratum of blue marl, which is distinguished from the upper one by the entire absence of shells. The district contains about 150 distinct mines, which are capable of yielding from 750,000 to 800,000 cantars (about 50,000 to 80,000 tons) annually. Of the richest mines, those of Gallizzi, Sommatino, and Favara, the yearly production has been 100,000, 80,000, and 60,000 cantars respectively.

The visitor to a sulphur-mine usually descends by a plane or staircase of high inclination to the first level, where he finds the half-naked miner picking sulphur from the rock with a huge and heavy tool; boys gathering the lumps together, and carrying them up to the surface; and, if water be there, the pumpmen hard at work draining the mine. A similar scene meets his eye in the lower or second level. Aboveground the sulphur is heaped up in piles or fusing in kilns.

Every stranger must be forcibly struck with the hardy and healthy look of the miners and burners, to which the lean and sickly aspect of the southern population forms a thorough contrast. The life of a pickman, which is sometimes said to be hard and wearisome compared with that of the peasant, is in reality easy, and suitable to Sicilian taste. His working-days do not exceed 250 in the year, and his hours of labour are only six in the day. Left, therefore, with eighteen hours a day to himself, he passes three-fourths of his time in eating, drinking, sleeping, and lounging about his village. Satisfied with animal existence, the pickman seeks not intellectual pleasures at the cost of increased exertion. His wages rise and fall with the price of the mineral; from 16*d.* to 20*d.* a day for himself, and about half as much for each of his boys, are reckoned good earnings. The pumpmen are ill-paid labourers compared with the pickmen. Their daily toil, if lighter, is longer and less intermitted; and their occupation is productive of sickness rather than conducive to health. Constantly drawing in sulphuretted hydrogen gas, which escapes from the agitated water, they suffer so severely in their eyes as often to become blind for 24 hours. They work for eight hours a day, and earn from 1*s.* to 1*s.* 4*d.* each. The burners, who extract the sulphur by fusing the ore in kilns made of gypsum and stone, or sometimes in close vessels or furnaces, usually earn about 1*s.* a day.

The sulphur thus obtained by liquation, when hardened into cakes, is taken down to the coast by carriers and muleteers. These are mostly small farmers, who are paid by the load, according to the time of the year and the demand for their services. Being seldom trustworthy people, these carriers are engaged by a warranter, who, for less than 1*d.* a cantar, becomes answerable for the safe delivery of the sulphur at the shipping-place. To Palermo and Catania the sulphur is conveyed in carts; to the southern ports it is carried down on mules and asses.

Such is the working part of a mining establishment. The overlookers are mining-captains, clerks, and a manager. The mining-captain, chosen from among the pickmen for his knowledge of the mine, examines the veins and directs the operation. As the right-hand man of the manager, he is looked upon by the pickmen and others as a person whose good opinion it is worth while to cultivate. Living in a substantial and commodious house, and dressing in a neat and becoming manner on Sundays and holidays, he holds a respectable place in village society. He usually resides a few miles from the works; but in some cases he dwells at the mine, where he is required to be in constant attendance from morning till night. His wages are from 2*s.* to 4*s.* a day; but many unlawful perquisites raise his earnings to a higher amount. After a few years' constant employment in a rich and extensive mine, he is usually able to retire with a competence sufficient for his limited wants. The clerks and watchmen, who keep account of piece-work and labourers' time, who receive the fused sulphur and weigh it out to the carriers, and who reside at the mine to take care of the works, usually earn from 1*s.* 8*d.* to 2*s.* 8*d.* a-day. The manager or head agent acts as treasurer and trustee for the owners or lessees of the mine. Aided by the mining-captain and the clerks, he engages and pays the workmen, and keeps the general accounts. His salary is from 4*s.* to 6*s.* 8*d.* a day. His gains are perhaps double this amount: so that he often makes his fortune in the course of a few years.

The number of persons regularly employed in the sulphur mines has been estimated at 4400: viz. 1300 pickmen, 2600 boys, 300 burners, and 200 clerks and others; to which if 3600 persons occasionally employed, viz. 2600 carriers, and 1000 wharfingers, be added, the total amount will be 8000 persons more or less engaged in the extraction of ore and the exportation of sulphur. A small portion of the sulphur carried down to Girgenti serves for the use of a royal refinery, whence it is exported to France and Austria in powder and in rolls. Previous to the sulphur contract the chief part was sent in cakes to England, France, Holland, Russia, and the United States, in the proportion of three-sixths to England, two-sixths to France, and the rest to other countries.

In the Sicilian market sulphur is divided into first, second, and third qualities of Licata (each of which is subdivided into best, good, and current), and into first and second quality of Girgenti, with the like subdivisions. The first and second qualities of Girgenti correspond with the second and third of Licata.

In former times, when the use of sulphur was confined to medicinal purposes and the manufacture of gunpowder, the exportation was small; but as soon as the mineral was applied to the making of carbonate of soda, the amount became considerable. The exportation from 1832 to 1838 was as follows:—

Year	Cantars.
Year 1832	400,890
1833	495,769
1834	676,413
1835	661,775
1836	855,376
1837	764,244
1838 (7 Months)	1,011,591
Total	4,866,058 = 371,312 Tons.

being at the rate of 739,140 cantars, or 56,857 tons, per annum. [Since this period the exports have been greatly varied in consequence of government regulations interfering with the commercial disposal of sulphur, and which have hardly yet ceased to operate; so that further returns would only give a fallacious representation.]

THE ETRUSCAN ANTIQUITIES OF THE BRITISH MUSEUM.

LIVING in a country which produced in abundance, and with little labour, all the means of enjoying life, the Etrurians appear to have abandoned themselves to ease and pleasure. Servile duties were committed to serfs, while their masters enjoyed the luxuries procured by their labour, and sat down twice a day to well-loaded tables, a custom which surprised the intellectual Greeks. Embroidered carpets, silver plate, trains of richly-clad slaves, gratified their taste for display and magnificence. Music, dancing, the theatre, heroic legends, and literature, gave some elevation to their more sensual enjoyments. Their life of easy enjoyment was varied by public games, horse and chariot races, and by the sports of the field. It is Niebuhr who says that, undoubtedly, Greek poems were familiar to the Etrurians, and the subjects of Greek mythology, and the legends of Thebes and Ilium, lived in the speech of the nation, and in poems in the native tongue. Stringed instruments are figured on the vases; but the proper native instrument was the flute. Well might their legends refer to Etruria as the chosen and favourite land of the gods. There abounded all that ministered to heathen happiness.

Niebuhr terms the Etrurians a "priest-ridden" people. The secret of the priesthood, whom he characterises as a "warlike sacerdotal caste, like the Chaldeans," was the interpretation of lightning. This and other branches of divination, as reading fate in the entrails of victims, and perhaps in the flight of birds, was taught in schools. Their knowledge of medicine, physic, and astronomy was neither borrowed from the Greeks nor Carthaginians, but is believed to have been indigenous, and brought with them from the north, when they conquered a more ancient people, and established themselves in their country. The Etrurian mode of determining time was extremely accurate, and based on the same principles as the computation observed by the ancient Mexicans.

The political state of Etruria is less obscure than some other portions of its history. There were certain sovereign cities, and the territory belonging to each contained provincial towns, some of them dependent colonies, others inhabited by subjects, the descendants of the old population that had been subdued. "Now," says Niebuhr, "because the Etruscan state was founded on conquest, hence arose the multitude of clients attached to the Etruscan nobility; hence the task-labourers, without whom the colossal works of the ruling people could scarcely have been raised. The Roman relation between patron and client was the feudal system in its noblest form; but even supposing that among the Etruscans a similar law of conscience bound the patron and protected the client, still it was on the free plebeian estate that the greatness of Rome rested; and none such, it is evident, existed in any Etruscan city. . . . It was not by popular assemblies, nor even by deliberations of a numerous senate, but by meetings of the chiefs of the land, the magnates, that the general affairs of the nation were decided upon: we must not imagine that the assemblies at the temple of Voltumna were of any other kind, or that they corresponded with the institutions of really free nations, such as the Latins and Samnites. These ruling houses," he adds, "were exposed to the violent revolutions which everywhere threaten an oligarchy, even from the midst of its own body, where it is not upheld by some powerful protection from without, open or dissembled;" and then the philosophical historian points out the consequence of isolated power. "Now, from this source, because a free and respectable commonalty was never formed among the Etruscans, but the old feudal system was obstinately retained and extended, arose the remarkable weakness of the great Etruscan cities in the Roman wars, when the victory was determined by a numerous stout infantry." Hence their cities were successively crushed by the power of Rome, and, as already stated, the towns, with their territories, were parcelled out among the legions.

We have no detailed account of the method pursued by the Etruscans in the manufacture of their vases, but D'Hancarville, in his 'Antiquités Etrusques,' has collected remarks in various ancient authors, from which he has attempted an account of their procedure, which may be briefly summed up as follows:—"The clay, which is of a very fine quality, they procured from the banks of the Vulturnus, a river of Capua, and, placing it in water, they allowed it to remain until it had become sufficiently pliant to be moulded into any form. They then, by means of the 'potter's wheel,' moulded the clay to the shape required, and while it was still wet a coating of iron ochre was applied, which, when heated at the last stage of the process, produced the black colour which generally forms the ground of the vases. The painter then drew in the ground of the figures; and as he did not exercise his art on a plane surface, but on one which was considerably curved, and was obliged, moreover, to keep the vases upright, as, in the plastic state in which they were at this period of their manufacture, their own weight, if placed sideways, would tend to alter their form, we may judge of the great difficulty he had to encounter in producing a continuous and even line. The borders and ornaments now appear to have been put in, and then the vase was placed in a furnace, where the colours were burnt in, and the whole completed."



[Etruscan Vase.]



[Mole—*Talpa Europæa*.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

MOLES.

Though rains and driving sleets "deform the day delightless," though "winter lingers on the budding bush," yet will not the field-naturalist, he who loves to observe for himself the progress of vegetation, and the habits and instincts of living things, deem the present month destitute of interest; and as he wends his way over greening fields, by thorny brakes, and tangled woods, he will observe many objects, and note many "unconsidered trifles," to him full of interest or instruction. Among these, the results of the labours of that "goodman delver," the mole, will not be overlooked.

The mole, like the rook, has its advocates and its opponents—one party regarding it as benefiting the agriculturist by its mining operations, another party accusing it as the author of extensive mischief. The benefits and the injuries produced by this little animal may be at once appreciated when we come to investigate its habits, instincts, and general economy. We need not say that the mole is a miner, living an almost exclusively subterranean life, ever pursuing its prey through the soil, and working out long galleries in the chase. In accordance with its destined habits is the whole of its structural development. No one examining the external conformation and internal structure of the mole could err in his inferences. We may observe that the body is cylindrical and compact; the snout prolonged and pointed; the limbs very short; the anterior pair present a thick, contracted arm, terminating in broad solid paws, with five fingers scarcely divided, and armed with strong flat nails. The tournure of these *scrapers*, for such they are, gives them an obliquely outward position, and facilitates their use as scooping instruments, by which the soil is not only dug up, but thrown backwards at each stroke, and that with great energy. The hinder limbs are small, and the feet feeble in comparison with the anterior *scrapers*: while the body tapers to them from the chest and shoulders, so the hinder quarters offer no impediment to the animal's progress through its narrow galleries. The fur, moreover, is such as best befits a subterranean dweller—it is extremely close, fine, short, and smooth, and resembles the nap of black velvet. There is no external conch to the organs of hearing, the sense of which is acute in the extreme; a simple auditory opening, capable of being closed or dilated at pleasure, leads to the internal apparatus, which is effectually defended from the intrusion of particles of earth or sand. At a cursory glance the mole appears to be destitute of eyes; they are, however, not wanting, though very small, and buried in the fur. A limited power of vision is sufficient for this dweller in the dark; the mole, however, can see better than might be imagined. By a peculiar muscular contrivance it is capable of bringing forward, or of drawing in, the eye—and this, when withdrawn, is enveloped in and defended by the close fur; so that, as is the case with the ear, no particles of earth can injure it. We have said that the sense of hearing is exquisite; and to it the mole trusts for warning on the approach of danger:—

> "Pray you, tread softly, that the blind mole may not
> Hear a foot fall."—Shakspere.

But the sense of smell is equally delicate; and by this it is guided in its search for food. It bores its long sharp nose in the earth as it traverses its galleries, and immediately detects worms and the larvæ of insects, which constitute its chief food. Nor is the feeling of this part at a low ratio: it is, on the contrary, very acute and susceptible, and aids the sense of smell in the procuring of food. The pointed snout is, indeed, a

finger-like organ of prehension, as well as a boring instrument. The general skin of the body is strong and tough, and not easily torn or lacerated.

When we examine the osseous and muscular development of the mole, we find a perfect correspondence with its external characters and the perfection of its senses. The great development of the skeleton is anteriorly, namely, in the bones of the shoulders, arms, and chest. The skull is depressed above, elongated, and pointed; and the snout, continued beyond the maxillary and nasal bones, is supported by a little additional bone, produced by the ossification of the cartilage. Its boring faculties are rendered still more effective by the ossified condition of the ligament of the neck, which passes from the back of the skull, down the cervical vertebræ, and which in other animals is elastic. The power of pushing with the snout is thus increased, and the strain upon the neck more easily borne. The muscles of the neck, which act on this bone and on the head, are very voluminous. The ribs are strong, and the capacity of the chest considerable. From the breast-bone an additional portion advances forwards, having a deep keel, as we see in birds, for the attachment of the enormous pectoral muscles, the force of which is employed upon the fore-limbs, in the act of excavating the earth. The collar-bones are thick and short; the blade-bone, or scapula, is long and narrow; the humerus is angular, and as broad as it is long; the bones of the fore-arm are strong and thick, and the olecranon of the ulna is large and transverse, for the insertion of voluminous muscles. The bones of the broad solid hands are compacted firmly together, and form an unyielding mass; and an additional lateral bone of large dimensions and compressed form, convex on its outer aspect, extending from the radius to the first metacarpal bone, not only enlarges the breadth of the hand, but adds to its firmness and solidity. The anterior limbs are thrown as far forward as possible, for it is to the projecting portion of the sternum that the clavicles are affixed, and the enormous pectoral muscles are inserted into the humerus as low down as possible. Their action is to bring the arm backward, the palms of the hands being turned obliquely outwards. The muscles of the scapula are distinguished rather for length than volume; they are elevators of the humerus, and their office requires celerity more than power, in order that the process of burrowing may be conducted with the least lapse of time between each stroke. As excavating instruments the fore-limbs and scrapers of the mole cannot be exceeded. Thus, then, in outward endowments and in internal structure, as well as in the perfection of its senses, is this animal fitted for its laborious operations, which cease not but with its life. We have alluded to worms and the larvæ of insects as constituting the food of the mole, and we shall find its teeth, which are small, exhibiting a decidedly insectivorous character; the molars being crowned with sharp-pointed tubercles or eminences.

From this very general glance at the organization of the mole, let us proceed to an investigation of its habits and modes of life.

> "Well said, old mole;—canst work in the earth
> So fast?—A worthy pioneer."—SHAKSPERE.

It is to M. Henri le Court, who, when the French Revolution broke forth with all the excesses an infuriated populace can be imagined to commit, retired into the country, and there, remote from scenes of devastation and bloodshed, devoted himself to the study of this animal, that we are indebted for the most interesting facts in its history.

The discoveries which were made by this observer were published in 1803, by M. Cadel de Vaux, and in a compressed form by M. Geoffroy St. Hilaire, in his 'Cours d'Histoire Naturelle.'

It would appear that the subterranean labours of the mole are exerted in the accomplishment of very different objects. Each mole may be said to have its own district or manor, its hunting-ground, and its lodges; and this ground is traversed by high-road tunnels, through which it travels from one part to another, all branching off from a central fortress—its ordinary residence, which is, however, not only distinct, but often remote from the chamber in which the nest is made and the young reared. We will begin by describing the fortress, or ordinary domicile:—This fortress is constructed under a hillock of considerable size (not one of those which we ordinarily see, and which, thrown up every night, indicate its hunting excursions). This hillock is raised in some secure place, where a high bank, the roots of a tree, or the base of a wall, afford protection. The earth forming this mound is well compacted together, and made solid by the labours of the architect; and within this firm-set mound is a complex arrangement of galleries and passages of communication. First, a circular gallery occupies the upper portion of the mound, and this communicates by means of five descending passages with another, and with a gallery at the base of the mound, and enclosing a larger area. These passages are nearly at equal distances. Within the area of this lower gallery is a chamber, not immediately communicating with it, but with the upper gallery, by three abruptly descending tunnels, so that to get into the basal gallery the mole has first to ascend to the top gallery, and from that descend into the lower gallery. This chamber is the dormitory of the mole. From the basal gallery opens a high-road tunnel, which is carried out in a direct line to the extent of the manor over which the individual presides, and from the bottom of the central chamber a passage descends, and then sweeping upwards joins this main road at a little distance from the hillock; so that the mole can enter the high-road either from its dormitory or from the basal gallery. Besides the high-road eight or nine other tunnels are carried out from the basal gallery; they are of greater or less extent, and wind round more or less irregularly, opening into the high-road at various distances from the hillock: these irregular tunnels the mole is continually extending in quest of prey; throwing up the soil above the turf, through holes which it makes for the purpose, and which form the ordinary mole-hills which we often see crowded thickly together. The high or main road exceeds in diameter the body of the mole, and is solid and well trodden, with smooth sides; its depth varies, according to the quality of the soil, instinct directing the little excavator in his work. Ordinarily it is five or six inches below the surface, but when carried under a streamlet or pathway it is often a foot and a half beneath. It sometimes happens that the mole will drive two or more additional high-roads in order to the extension of its operations; and one high-road occasionally serves several moles, which, however, never trespass on each other's preserves. They often meet in these roads, which will not admit of two passing at the same time; one therefore must retreat, but when two males thus come into collision they frequently attack each other, the weaker falling a victim in the combat. The alleys opening from the sides of the high-road are generally inclined downwards with a gradual slope, and then at the termination of these the mole excavates branch alleys, upheaving mole-hills as it works onwards in pursuit of prey. This, however, is not invariably the case, but rather where prey is abundant in rich soils: where the soil is barren the mole is constantly driving fresh alleys; these in winter are carried deep down to where the

worms have pierced their way beyond the line to which the frost penetrates; for, be it observed, the mole does not hybernate, but is as active during winter as in spring or summer, though the results of his operations are less manifest. In soft rich soils, where the worms are among the roots of the turf, the mole, as may be often noticed, drives very superficial runs in the pursuit of them; these runs are to be seen where a thin layer of richly manured soil overlays a stratum of gravel: in fact the depth of these alleys is always determined by the quality of the soil and consequent situation of the worms. With respect to the nest of the female, it is generally constructed at a distance from the fortress, where, at some convenient part, three or four passages intersect each other: this point of convergence is enlarged and rendered commodious, and fitted to receive a bed made of dry herbage, fibrous roots, &c. The chamber is generally beneath a large hillock, but not always; and the surrounding soil is usually such as to afford abundant food to the female with little trouble on her part. The mole breeds in the spring, mostly in April, and brings forth four or five young at a birth. These are supposed to remain under the mother's care till about half grown, when they commence an independent existence.

Of all animals the mole is one that endures fasting the least; a short fast proves fatal to it, hence it is necessarily ever labouring in quest of food. It would appear that all its animal appetites are in excess; its hunger is voracity amounting to rage, under the influence of which it fastens on its prey with intense eagerness. Earthworms are its favourite food, and these it skins with great address, squeezing out the earthy contents of the body before swallowing it. It is not, however, exclusively upon earthworms and the larvæ of insects that the mole feeds; during the months of June and July it is in the habit of leaving its runs under the turf, and of wandering during the night (and occasionally even during the day) on the surface, in quest of prey, such as birds, mice, frogs, lizards, snails, &c.; but it refuses to touch the toad, in consequence no doubt of the acrid exudation from that reptile's skin. During these noctural excursions it often falls a prey to the owl; and we have seen it in the day time caught and killed by dogs. It might be supposed from the figure of the mole that its motions were very slow and deliberate; it trips along, however, at a fair pace, and traverses its underground runs and galleries with great rapidity. Of this the experiments made by Le Court afford decisive proof. Watching the opportunity while a mole was feeding, at the extreme limits of its territory, he placed along the course of the high road to its fortress a number of little flagstaffs, each staff being a straw, and the flag a bit of paper; the ends of the straws were pushed down into the tunnel. When all was ready he blew a horn inserted into one of the openings of the feeding alleys, frightening with the horrid blast the animal then busily engaged in the important task of satisfying its hunger. Off started the mole for its fortress, and down went flag after flag in rapid succession, as the frightened creature impelled by terror rushed along the tunnel to its asylum. So swift was its pace, that the spectators compared it to that of a horse at a moderate trot.

The voracity of the mole and its perpetually-recurring repasts upon animal food, render water not only a welcome refreshment, but necessary to its existence. A run, sometimes used by many individuals, always leads to a ditch, stream, or pond, if such be within a moderate distance. If these natural supplies be not at hand, the mole sinks little wells, in the shape of perpendicular shafts, which become filled with the rain, and retain the water; and they have sometimes been found brimfull. Scarcity of water, or a drought, as well as a scarcity of worms, often obliges the mole to shift its quarters, and locate upon other grounds. In its migration it will cross brooks or rivers, swimming admirably; and when spring or autumn floods inundate the fields, it easily saves itself by these means. It is moreover affirmed that in this peril the male and female brave the waters together, and expose themselves to the utmost danger in order to save their young, in which office of parental devotion they mutually assist and protect each other.

It is a remarkable circumstance that the males of this animal are far more numerous than the females, and in the early part of the spring the former often engage in most desperate conflicts, the victor not unfrequently leaving the vanquished dead upon the spot. The attachment of the male to his mate is very powerful;—and instances are not uncommon of the male lying dead beside the female, the latter having been killed in a trap. It must be recollected that a short fast proves fatal to these animals—and it is not improbable that, impelled by the force of instinctive attachment, which overcame that of hunger, the male rejected or forbore to seek food, and thus pined to death.

With the voracity of the mole is joined a fierce and combative disposition. If several moles be kept in a box of earth, and not supplied with an abundance of food, they attack each other, and the weaker falls a prey to the stronger: when the mole seizes, it holds like a bull-dog, with a tenacious gripe; and is not easily disengaged. Mr. Jackson, as stated by Mr. Bell, says that, "when a boy, his hand was so severely and firmly laid hold of by one, that he was obliged to use his teeth in order to loosen its hold." M. Geoffroy St. Hilaire describes the manner in which the mole approaches and seizes a bird: it exerts several stratagems to get within reach of its victim, employing the utmost address and caution; but when this is accomplished, it suddenly changes its plan, and makes an instantaneous and impetuous attack, fastens on the hapless bird, tears open the abdomen, thrusts its snout among the viscera, and revels in its sanguinary repast. After satiating its ravenous appetite, the mole sinks into a profound repose: in the winter it slumbers in its fortress; but in the summer, beneath some ordinary mole-hill in one of its alleys. This sleep endures for about four hours, or perhaps longer in the middle of the day, when it awakes with a renovated appetite. Its busiest time is in the evening, during the night, and early in the morning. We have, however, ourselves seen it busy above-ground in the earlier part of the day; on one occasion we saw several in a damp meadow near the canal running from Calais to St. Omer, and a dog belonging to one of the passengers on board the boat killed two or three.

From what we have said of the habits of the mole, some idea may be formed as to whether it injures or benefits the agriculturist and horticulturist.—It is certainly not herbivorous; for though fibrous roots and other vegetables have been occasionally found in its stomach, it is evident that they were only accidentally swallowed with the worms it had dislodged from among the roots of the grass, or with the larvæ which it had extricated by gnawing the vegetable matters into which they had bored. As regards its nest, which is made of dried grasses, fibrous roots, moss, and the like, little injury can result from the animal constructing it of these materials. It is true that Geoffroy St. Hilaire and Le Court counted two hundred and four young wheat-blades in one nest, but this is evidently not an ordinary occurrence. It is alleged that the fortresses which the mole constructs for its autumn and winter residence, when left in the summer (the mole usually forming a new one for its next winter retreat), afford protection to the field-mouse, of which the ravages are

often so severe; but the field-mouse would make a burrow for itself, did it not find one constructed for its purpose, and would neither leave the spot nor become diminished in numbers if not a mole-hill were in the country; besides, the field-mouse frequently falls a prey to the mole. This objection, therefore, against the mole is destitute of solidity, though it has often been urged. The injury, therefore, which the mole produces must be, first, from thinning the soil of earthworms; and secondly, from making galleries, and thus interfering with the roots of vegetables, thereby causing their destruction. The first argument has perhaps some weight. The utility of the earthworm is unquestionable. It loosens the soil by its boring operations; thereby rendering it more porous and susceptible of the infiltration of water, so essential to the nutriment of plants. It moreover raises as well as lightens the surface of the soil, insomuch that stones and other objects which cumber the ground are even in a few months buried beneath an accumulation of mould, the rejectamentum of the nutritive materials of myriads of these creatures, the effect of whose agency is to level and smooth the surface of the soil and fit it for herbage. Thus may they be called pasture-makers, or top-dressers of pasture land. Still, granting all this, it is questionable whether in rich soils the quantity of worms destroyed, however great, would materially reduce their countless numbers. With respect to the second point, moles certainly do mischief in some cases to the farmer, by excavating their runs and galleries, and that especially in fields of grain, after the seed is sown, and when the blades are rising: they do more mischief, however, in gardens; but there they occur very rarely. There are, however, cases in which the mining operations of the mole appear to be decidedly beneficial. In extensive sheep-walks, the subsoil which they throw up forms a good top-dressing to the short grass, the roots of which they do not appear to injure, and it has been asserted that sheep-walks from which these animals have been extirpated have become materially altered in the character of their '*feed*,' and that the proprietors of the sheep have been obliged to introduce them again. It may be concluded, then, that the evils which the mole occasions by its works have been greatly magnified; while, perhaps, on the other hand, too much benefit has been attributed, by its advocates, to the results of its habits and economy.

The mole does not exist in the extreme north of Scotland, in Zetland, or the Orkney Islands, nor has it been seen in any part of Ireland.

Varieties of this animal often occur: we have examined specimens of a mouse-colour, of a white, cream white, and pale yellowish orange.

The names by which the mole is known in England are Mouldwarp, Mouldiwarp, and, in Dorsetshire and Devonshire, *Want*. "Wand" is its old Danish name; and "Vond" its present name in Norway. The Welsh term it Gwadd, and Twrch daear. It is the Maulwerf of the Germans; La Taupe of the French; Topo of the Spanish; Toupeiro of the Portuguese; and Talpa of the Italians.



[Fort Chippewa, on the river Welland, or Chippewa.—From a Drawing by Mrs. Simcoe, taken during the American Revolutionary War.]

THE NIAGARA DISTRICT, WESTERN CANADA.—No. II.

THE district situated between Lake Ontario and Lake Erie, as it has been the longest settled, so also is it the best cultivated part of Western Canada. The vicinity to the two great lakes renders the climate more agreeable, by diminishing the severity of the winter and tempering the summer heats. Fruits of various kinds arrive at great perfection, cargoes of which are exported to Montreal, Quebec, and other places situated in the less genial parts of the Eastern province. Mrs. Jameson speaks of this district as "superlatively beautiful." The only place approaching a town in size and the number of inhabitants, from the Falls all along the shores of Lake Erie for a great distance, beyond even Grand River, is Chippewa, situated on the river Welland, or Chippewa, which empties itself in the Niagara Strait, just where the rapids commence and the navigation terminates. One or more steam-boats run between Chippewa and Buffaloe. Chippewa is still but a small village, but as it lies immediately on the great route

from the Western states of the American Union to the Falls of Niagara and the Eastern states, it will probably rise into importance.

In no country on the face of the globe has nature traced out lines of internal navigation on so grand a scale as in North America. Entering the mouth of the St. Lawrence, in the north-eastern part of the continent, we are carried by that river through the great lakes to the head of Lake Superior, a distance of nearly nineteen hundred miles. On the south we find the Mississipi pouring its waters into the Gulf of Mexico, within a few degrees of the tropics, after a course of three thousand two hundred miles. The 'Great Water,' as the name signifies, and its numerous branches, drain a surface of about one million one hundred thousand square miles, or an area about twenty times greater than England and Wales. The tributaries of the Mississipi equal the largest rivers of Europe. The course of the Missouri is probably not less than three thousand miles. The Ohio winds above a thousand miles through fertile countries. The tributaries of *these* tributaries are great rivers. The Wabash, a feeder of the Ohio, has a course of about five hundred miles, four hundred of which are navigable. When the canal is completed which will unite Lake Michigan with the head of navigation on the Illinois river, it will be possible to proceed by lines of inland navigation from Quebec to New Orleans. There is space within the regions enjoying these advantages of water-communication, and already peopled by the Anglo-Saxon race, for five hundred millions of the human race, or more than double the population of Europe at the present time. Imagination cannot conceive the new influences which will be exercised on the affairs of the world when the great valley of the Mississipi, and the continent from Lake Superior to New Orleans, is thronged with population. In the valley of the Mississipi alone there is abundant room for a population of a hundred millions.

The line of navigation by the St. Lawrence did not extend beyond Lake Ontario until the Welland canal was constructed. This important work is forty-two miles long, and admits ships of one hundred and twenty-five tons, which is about the average tonnage of the trading vessels on the Lakes. The Niagara Strait is nearly parallel to the Welland canal, and more than one-third of it is not navigable. The canal, by opening the communication between Lake Ontario and Lake Erie, has conferred an immense benefit on all the districts west of Ontario. The great Erie canal, described in No. 466, has been still more beneficial, by connecting the lakes with New York and the Atlantic by the Hudson river, which the canal joins after a course of three hundred and sixty-three miles. The effect of these two canals was quickly perceptible in the greater activity of commerce on Lake Erie, and the Erie canal has rendered this lake the great line of transit from New York to the Western states.

The first steam-boat which navigated the lakes was built at Erie in 1818. In that year the tonnage of all the lakes did not exceed two thousand tons; but, according to Mr. Buckingham's very recent statement, it now exceeds fifty thousand tons, and employs six thousand men. The largest of the steam-vessels are from seven to eight hundred tons, and the smallest three hundred tons. Some of the finest steam-boats in the United States are to be found here. They navigate from Chicago on Lake Michigan, to Buffaloe in the state of New York, a distance of nearly a thousand miles; and a great part of the voyage on these inland seas is made out of sight of land. The steam-boats are built as strongly as if intended for navigating the ocean. Mr. Buckingham, who was much struck with their capabilities, and the excellence of all their internal arrangements, gives the following account of two which particularly attracted his attention:—"The Illinois," he says, "is built after the fashion of the Eastern boats, such as go between New York and Providence or Boston, but much more elegant than any of these. The Illinois indeed may be called a floating palace, the most costly decorations being everywhere lavished on her, as may be judged of from the fact of her costing 130,000 dollars (27,000*l.*) from the builder's hands. The Great Western is another splendid boat, still larger than the Illinois, and almost as richly ornamented, but built on the plan of the Mississipi boats, with a double deck of cabins, so as to accommodate about five hundred passengers, with high-pressure engines, but combining also speed, safety, and comfort in an unusual degree." In the passage down Lake Erie, ships, brigs, sloops, and schooners are seen in every direction on the horizon. Mr. Buckingham counted above one hundred, and twenty-two were in sight at one time. The voyage from Cleaveland, or the southern shore of Lake Erie, to Buffaloe, a distance of one hundred and ninety miles, occupied about sixteen hours. How great the contrast to the time when only the Indian canoe was seen upon these waters!

SOUTH STAFFORDSHIRE AT NIGHT.

Many of our counties excel Staffordshire in those traits which, either for their beauty or their singularity, attract the attention of the traveller when viewed by day; but perhaps none is more remarkable, more startling than this, when seen by night, especially the southern portion of the county. The whole face of the country seems to be on fire. A lurid glare speckles the scene around in a manner very inexplicable to one unacquainted with the mineral character of the district. From Birmingham to Wolverhampton, from Stourbridge to Walsall, in whatever way we travel, by night, over the extreme southern portion of the county, appearances are presented which, if seen near London, would set all the Fire Brigade into activity.

We are to look to the mines of coal and iron as the source of these peculiarities. South Staffordshire is one of our richest and most valuable mineral districts. It possesses the ironstone which affords, by smelting, the metallic iron for our various uses, and it supplies the coal for the smelting. In the geological maps of the county, the coal and iron district is marked out by some such limits as the following:—From Stourbridge and Halesowen in the south (near the latter of which Shenstone's residence of the Leasowes was situated) to Rugeley in the north, an elongated oval marks the region, the eastern boundary passing by Walsall, West Bromwich, and Smethwick; and the western by Cannock, Wolverhampton, and Sedgeley. The district is perhaps twenty miles long, in a straight line, from north to south, and four or five in average width; the southern half of this elongated oval has been the most extensively worked, Dudley, Tipton, Bilston, and Wednesbury being the centre of the busiest portion.

Most of our old topographers and historians have more or less alluded to this region of coal and iron. Camden, who is supposed to have travelled through South Staffordshire about the year 1575, says of it:—"The south part of Staffordshire hath coles digged out of the earth, and mines of iron. But whether more for their commoditie or hinderance, I leave to the inhabitants who doe or shall better understand it." What Camden means by this is not very clear; except that he took rather a slighting and unfavourable view of that which has given wealth and influence to South Staffordshire.

The records of the iron-works of Staffordshire go

further back than those relating to coal. All our iron is now smelted with coal, or with coke produced therefrom; but formerly wood-charcoal was believed to be the only fuel fitted for this purpose; and this circumstance produced a remarkable effect on the surrounding districts. Domesday-Book and other authorities state that large portions of South Staffordshire, and the neighbouring part of Warwickshire, were covered with wood; whereas at the present day the amount of wood is extremely small, the deficiency having been occasioned by the large use of wood-charcoal in smelting the iron. A curious surmise has been offered as to the changes which the iron-smelting has produced in the districts near which it is carried on. It is supposed that in early times the north-western parts of Warwickshire, nearest to Staffordshire, were once covered with wood, and were known by the name of Arden, from a British or Celtic word implying *Woodlands*. There are still towns, such as Hampton in Arden and Henley in Arden, which seem to support this supposition. The iron of Staffordshire required, for its smelting, the wood of Warwickshire; and thus the two met, as at a centre, at Birmingham, Dudley, Wednesbury, Tipton, and Walsall. Birmingham is not itself situated in the iron district; but occupying the margin of the two regions just indicated, we arrive at something like a means of accounting for the location of manufactures in metal in these quarters.

In former times the iron-ore was not smelted on the spot where it was procured, from the gradual exhaustion of the wood required for the charcoal employed in the smelting. It was carried, partly on horses' backs and partly by other means, to places more favourable for the smelting. But now all this is at an end. The material accompanying the iron-ore is found to be adequate to the smelting; and a circle of five or six miles radius, drawn around the town of Tipton as a centre, would be found to include an extraordinary number of establishments wherein the iron-ore is dug from the mine, the coal also procured, the coal converted into coke, and the iron-ore smelted by the aid of the coke thus produced. In order to understand the effect of these arrangements on the surrounding district, it may be well briefly to explain the extent and position of the mineral treasures. We have in former volumes so fully explained the operations connected with the smelting of iron, that a very few details will suffice to illustrate our present object.

Over an area of about ninety square miles, in that part of Staffordshire immediately north-west of Birmingham, extends the Staffordshire 'Coal-field;' the strata of coal and of iron-stone occurring pretty nearly in every part, interspersed here and there by beds of different earths, such as clay, rock, sand, &c. The most remarkable strata of coal have distinctive names, by which they are known to the miners and workmen: thus the 'ten-yard coal' alludes to a seam or stratum about thirty feet in thickness. This is deemed a very rich and valuable bed of coal, and extends over the southern half of the district: it becomes thinner by degrees, and 'crops out,' or comes to the surface, near Bilston. Northward of this point, as far as Rugeley, a thinner stratum of coal is found. The general 'dip' or inclination of the strata is south and north; but many irregularities and disturbances of direction occur. Near Rugeley a 'four-yard bed' is worked at a depth of a hundred yards below the surface; southward of Wednesbury the pits are stated to be on an average an equal depth to the former; near West Bromwich and Oldbury, a hundred and thirty yards; at and near Wednesbury, forty or fifty yards; while at one spot near Wolverhampton the coal comes so near the surface, as to be procured in an open cutting, without any subterranean operations. Such are the diversities in the position of the coal; and such the mode in which the miners must follow it. Whatever quirks and turns the bed of coal takes, thither do the miners follow it with their pickaxe; slanting upwards, slanting downwards, or branching out laterally, as the case may be. A shaft is sunk from the surface of the ground to the level of the coal-bed, generally at such a spot that the coals, as cut away from the bed, may have a downward path towards the shaft. If it be the 'ten-yard coal,' the operations of the miners are tolerably straight forward, gunpowder and the pickaxe enabling him to detach mass after mass of the mineral treasure; but if the bed or seam of coal be thin, it is extraordinary to conceive how the miner can insinuate his body, in a working attitude too, in such small apertures. The recent Report of the Parliamentary Committees on Mines and Collieries gives us some striking information on this point.

Passing from the coal to the iron, we find that this comes from an ore denominated 'clay-iron-stone,' a mixture of iron, clay, and other substances, in which the iron is a more or less abundant ingredient, according to the richness of the specimen. It accompanies the coal, in greater or less quantities, throughout the whole district; being found in some strata in continuous beds, and in others taking the form of balls or lumps distributed among the clayey and other deposits. It is situated, geologically, both above and below the 'ten-yard coal;' and when found in beds or seams, it is known by the miners under the names of 'blue flats,' 'blue clist,' and 'white stone.' When it occurs in balls or lumps, these are found imbedded in clayey earth of considerable hardness, designated, according to its varieties in quality, by the odd names of 'church,' 'binds,' 'iron-stone-bearer,' 'penny-earth,' 'gubbin-stone,' 'poor robin,' &c. The iron-ore is usually closely accompanied by coal in the mine; and it is generally extracted after the coal has been removed. It is detached in small masses by the pickaxe, much in the same manner as coal; but the extraction is often more difficult, owing to the thinness of the seam. A miner will often carry on his operations in a seam only two feet in height, into which he will insinuate his body and his working tools.

These are the two minerals, the preparation of which on reaching the surface of the ground gives rise to the remarkable appearance which this part of Staffordshire presents at night. The coke-ovens, or rather coke-hills, and the iron-furnaces, are the scenes of the fire and flame and smoke which meet the traveller's eye while passing over—say from Birmingham towards Shropshire, or from Kidderminster through Dudley towards Lichfield. These coke-hills are structures of which we know nothing near London. Our manufacturers make coke in close chambers, such as ovens or retorts; but in Staffordshire, whether it be to save expense, or whether the Staffordshire coal requires a method of coking different from that which is observed in respect of the coal used near London, the coal is coked out in the open air. Near the furnace, in a spot of ground kept vacant for the purpose, the coal is heaped up in a form somewhat resembling that of a bee-hive, of large dimensions, and then set on fire; the top is covered with a layer of clay or other earthy substance, which will prevent the coal from bursting out too briskly into flame, and will cause it to smoulder till it assumes the form of coke. When a number of these hills are watched from a distance, we see smoke emanating from them in abundance, and, here and there a flickering flame, when anything occurs to disturb the clay coating on the surface.

These coke-hills constitute one source of the glare which the district presents, a never-ending series of coking operations being carried on. Another source

is that of the iron-furnaces, from whose summits a lofty pillar of flame repeatedly ascends. These furnaces are bulky brick structures, capable of containing a vast quantity of material procured from the mines. The iron-ore and the coke, together with some third substance, such as limestone, to act as a flux, are all put into these furnaces, where they are kindled. Day and night, Sunday and week-day, in rain and in sunshine, does this continue; the ingredients being thrown in at the top of the furnace, the iron being separated from the earths by the effect of heat, and the melted metal flowing out at stated intervals from openings in the bottom of the furnace. In London, where all except a small number of factories cease smoking at night, we have hardly a conception of the startling effect which these ever-burning furnaces present, especially at those hours when darkness would otherwise prevail around. Perhaps the coach-road from Birmingham to Wolverhampton is that which affords to a night traveller the most remarkable and numerous examples of this kind, having the districts around Oldbury, Dudley, Tipton, and Sedgeley, in the south, and those around Wednesbury, Walsall, and Bilston, on the north.

There is yet another source of the flickering flames so often alluded to. In some of the iron-works where casting or founding is executed, the metal is melted in lofty furnaces, open, or partially open, at the top; or rather the flame from the fire beneath often ascends to the top of the chimney, and thus presents a vivid object visible from a great distance.

The appearance of the district by day is very accurately described by Mr. Hawkes Smith, in his 'Birmingham and its Vicinity.' After speaking of the clouds of smoke, the bulky furnaces, and the tall chimneys which meet the visitor's gaze, he proceeds:—"Here and there he sees protruded the mighty arm of the giant of art, the potent steam-engine, whirling the heavy fly which regulates the motion of the whole attached machinery; while the sky is crossed by the light tracery of wheels and ropes adapted to the purposes of the mines, both right and left of the moving-power. The prospect, where the view is not impeded by the flat-topped mountainous ridges of cinder, is varied by numerous clustering hamlets, or assemblages of small houses, the habitations of the countless labourers and others called into activity by the neighbouring 'Works;' interspersed here and there with modern mansions of superior pretension oddly placed; or with dwellings of a still less congruous character, curious specimens of fretted brick-work, embroidered chimney-stacks, and chevroned gables; or black and white timbered grange-houses, the relics of an agricultural age, invaded by the encroachments of smoke and bustle,—all intermixed with a moderate supply of green or greenish fields, dotted occasionally with sooty sheep or cattle. Canals, with all their appurtenances, intersect the region in every direction, and strange noises from every quarter are wafted to the ear."

Those who have visited inns and private houses within ten or twenty miles of the district now under notice, may have remarked the huge cheerful blazing fires of Staffordshire—coal everywhere to be found. Fuel is procurable at a price which may well excite the envy of a Londoner; and we see the effects of this cheapness in the kind of fires kept up in the dwellings.

It may be well to remark that in using the term "South Staffordshire," we employ one which expresses the name of the district more correctly than any other. But, in truth, it is not easy to say what county we are in while traversing it; for Warwickshire, Staffordshire, Worcestershire, and Shropshire intertwine so greatly at this part, and there are so many outlying patches, wholly detached from the counties to which they nominally belong, that we may change our county three or four times in the course of a few miles' walk. Birmingham is in Warwickshire; Oldbury and Halesowen in Shropshire; Dudley and Stourbridge are in Worcestershire; and Wolverhampton, Walsall, Wednesbury, and Tipton in Staffordshire. And yet all these towns are within a circle of six miles radius. Even in the short distance from Birmingham to Dudley (seven miles in a straight line) we quit Warwickshire, pass into Staffordshire, thence to Oldbury in Shropshire, then a second time into Staffordshire, and end at Dudley in Worcestershire.

PUBLIC REFRESHMENTS.

DINING.—*From* 'LONDON.'

THE fortunes of Roderick Random and his companion Strap show that, in Smollett's time, there were *cellars* in London attended as eating-houses, down which many a man was wont to "dive for a dinner." When Roderick and Strap arrived in London, and had taken a cheap and obscure lodging near St. Martin's Lane, they asked their landlord where they could procure a dinner. He told them that there were eating-houses for well-dressed people, and cellars for those whose purses were somewhat of the lightest. Roderick said that the latter would better suit the circumstances of himself and his companion; whereupon the landlord undertook to pilot them to one of these cellars:—"He accordingly carried us to a certain lane, where stopping, he bid us observe him, and do as he did; and, walking a few paces, dived into a cellar, and disappeared in an instant. I followed his example, and descended very successfully, where I found myself in the middle of a cook's-shop, almost suffocated with the steams of boiled beef, and surrounded by a company consisting chiefly of hackney-coachmen, chairmen, draymen, and a few footmen out of place or on board-wages, who sat eating shin-of-beef, tripe, cow-heel, or sausages, at separate boards, covered with cloths which turned my stomach. While I stood in amaze, undetermined whether to sit down or walk upwards again, Strap, in his descent, missing one of the steps, tumbled headlong into this infernal ordinary, and overturned the cook as she was carrying a porringer of soup to one of the guests. In her fall she dashed the whole mess against the legs of a drummer belonging to the foot-guards, who happened to be in her way." How the drummer swore, and the cook rubbed his leg with salt, and Roderick recommended the substitution of oil, and how Strap made his peace by paying for the soup and treating the drummer, need not be told. The cook's-shop in the cellar is sufficiently depicted.

It is probable that itinerant piemen, such as Hogarth gives to the life, have for centuries formed one class of London characters, and that various other eatables, and drinkables too, have been vended about in a similar manner, time out of mind; but by what steps the modern cook's-shop, or eating-house, has reached its present condition, it is not perhaps easy to say. There are, it appears, about two hundred places in London which can fittingly come under the denomination of eating-houses, occupying a place between the hotels on the one hand and the coffee-rooms on the other. At all of these places joints of meat are dressed every day, depending for variety on the extent of business done, but generally including boiled beef and roast beef, as well as the necessary appendages for the formation of a dinner. In some of these houses the quantity of meat dressed in a week is quite enormous; and it seems pretty evident that the greater the sale the better the quality of the articles sold—or perhaps we may take it in an inverse order, that the excellence of the provisions has led to the extent of the custom.

Some of these dining-rooms are the scenes of bustle during only a few hours of the day; while others, either from the extent of their trade or the different classes of their visitors, present a never-ceasing picture of eating and drinking. Some, such as a celebrated house in Bishopsgate-street, are frequented almost entirely by commercial men and City clerks, who, during a few hours in the day, flock in by hundreds. Then again others, such as Williams's boiled-beef shop in the Old Bailey, and a few in the neighbourhood of Lincoln's Inn Fields, are frequented almost entirely by lawyers' clerks, witnesses, and others engaged in the law or criminal courts. In all such places there is a "best" room for those whose purses are tolerably supplied; and a more humble room, generally nearer to the street, for such as can afford only a "sixpenny plate." Again, on going farther westward, we find in the neighbourhood of Covent Garden and the Haymarket dining-rooms in great plenty, the visitants at which are altogether of a different class. Here we may see actors, artists, paragraph-makers, and foreigners, most of whom seem in much less haste than the City diners. In this quarter of the town there are many French restaurateurs, whose rooms present the agreeable variety of ladies dining without any restraint from the observation of the male visitors.

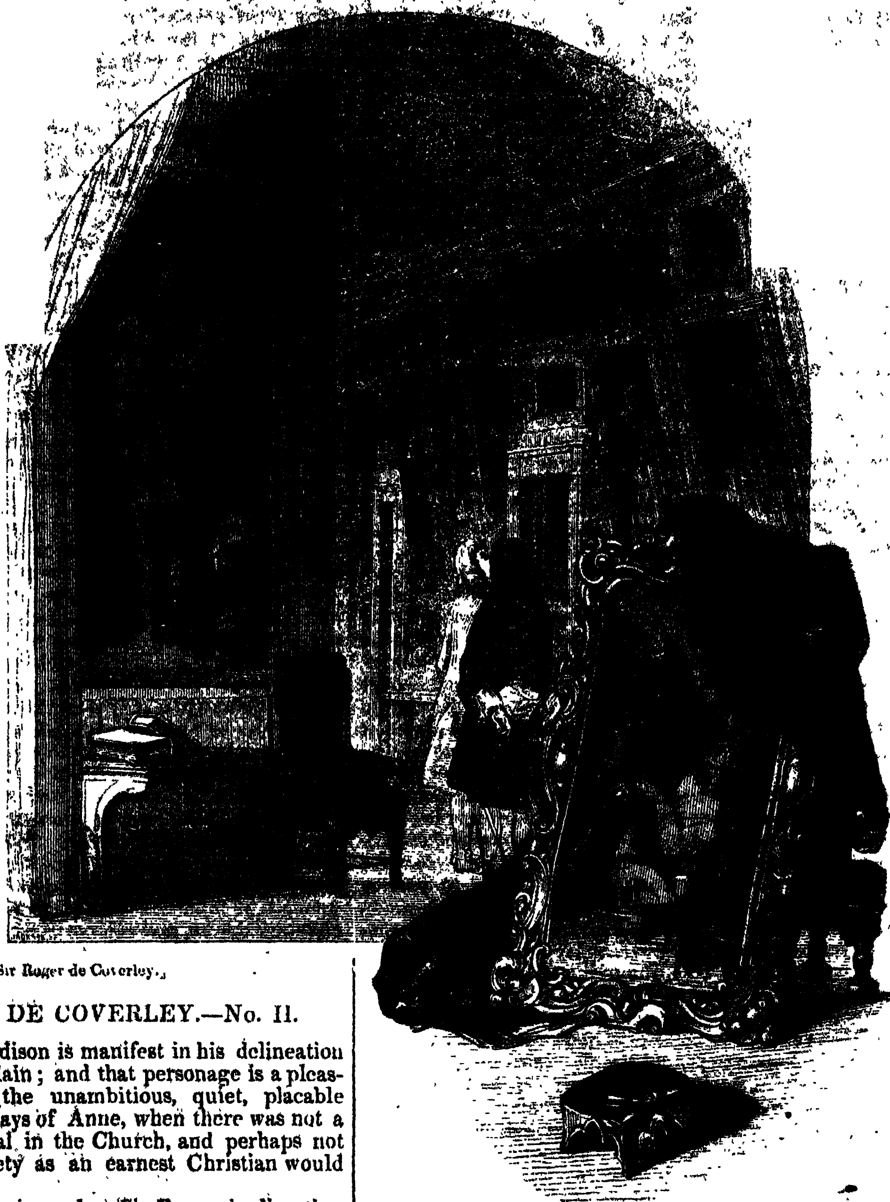
It is observable that in some houses the waiter gives the diner a long detail of the good things which are "just ready," while in others there is a printed bill of fare placed before him. The latter is certainly the most systematic method; for, by the time the nimble waiter has got through his speech, we almost forget the first items to which he directed attention. In the "bill of fare" all the dishes customarily prepared at the house are printed in certain groups, and the prices are written opposite those which are to be had hot on any particular day, so that a customer can at once see what provisions are ready, and how much he shall have to pay for them. In the opposite case, where the visitor knows nothing of the matter but what the waiter tells him, the routine of proceedings may be thus sketched:—The guest, perhaps a man of business who has but little time to spare for his dinner, enters the room, takes the first seat he can find (the one nearest the fire in cold weather), takes off his hat, and asks for the 'Times' or the 'Chronicle.' While he is glancing his eye rapidly over the daily news, the active tidy waiter, with a clean napkin on his left arm, comes to his side, and pours into his ear, in a rapid but monotonous tone, some such narrative as the following:—"Roast beef, boiled beef, roast haunch of mutton, boiled pork, roast veal and ham, salmon and shrimp-sauce, pigeon-pie, rump-steak pudding." The visitor is perhaps deep in the perusal of "Spanish Scrip" or "Columbian Bonds," or some other newspaper intelligence, and the waiter is obliged to repeat his catalogue; but, generally speaking, the order is quickly given and quickly attended to. A plate of roast beef, which may be taken as a standard of comparison, is charged for at these places at prices varying from 4*d.* to 10*d.*, generally from 6*d.* to 8*d.*; and other articles are in a corresponding ratio. When the meat and vegetables have disappeared, the nimble waiter is at your elbow, to ask whether pastry or cheese is wanted; and when the visitor is about to depart, the waiter adds up, with characteristic rapidity, the various items constituting the bill. "Meat 8*d.*, potatoes 1*d.*, bread 1*d.*, cheese 1*d.*," &c., are soon summed up; the money is paid, and the diner departs.

At the alamode-beef houses the routine is still more rapid. Here a visitor takes his seat, and the waiter places before him a knife, a fork, and a spoon; and gives him the choice among sundry lumps of bread [illegible] an open basket. Meanwhile the visitor asks for a "sixpenny plate;" and it may happen that two other customers ask at the same time, the one for a sixpenny and the other for a fourpenny plate. Out goes the waiter, calling, in a quick tone, for "two sixes and a four;" a brevity which is perfectly well understood by those who are to lade out the soup from the cauldron wherein it is prepared. Presently he returns with a pile of pewter-plates, containing the "two sixes and a four," and places them before the diners.

There is a lower class of soup-houses, where persons to whom sixpence is even too much for a dinner may obtain wherewithal to dine. Whoever has had to walk through Broad-street, St. Giles's, or down the northern side of Holborn-hill, may have seen shops, in the windows of which a goodly array of blue and white basins is displayed, and from which emanate abundant clouds of odour-giving steam. Around the windows, too, a crowd of hungry mortals assemble on a cold day, and partake (in imagination) of the enticing things within. A poor fellow, all in tatters, with a countenance which speaks strongly of privation, gazes eagerly through the window at what is going on within, and thinks how rich a man must be who can afford to pay twopence or threepence for "a basin of prime soup, potatoes, and a slice of bread;"—for it is at some such charge as this that the viands are sold.

The "chop-houses" in the City form a class by themselves. They are neither eating-houses nor taverns, nor do they belong to classes hereafter to be noticed. The solid food here to be procured is chiefly in the form of a steak or a chop, with such small appendages as are necessary to form a meal. There is no hot joint from which a guest may have a "sixpenny" or a "ninepenny" plate; nor are there the various dishes which fill up the bill of fare at a dining-room. Every guest knows perfectly well what he can procure there. If a chop or a steak will suffice, he can obtain it; if not, he goes to some house where greater variety is provided. With his chop he can have such liquor as his taste may prefer. There are some of these houses which have been attended by one generation after another of guests, comprising merchants, bankers, and commercial men of every grade. The portrait of the founder, or a favourite waiter, may perhaps be seen over the fireplace in the best room; and the well-rubbed tables, chairs, and benches tell of industry oft repeated. Sometimes the older houses exhibit a waiter who has gone through his daily routine for half a century. There is a dingy house in a court in Fleet-street where the chops and steaks are unrivalled. Who that has tasted there that impossible thing of private cookery—a *hot* mutton-chop, a second brought when the first is despatched—has not pleasant recollections of the never-ending call to the cook of "Two muttons to follow?"

Many houses have what is termed in France a *table-d'-hôte*, or in England an *ordinary*; that is, a dinner ready for all comers at a fixed hour in the day, and at a fixed charge. The host determines on the choice of good things to constitute the bill of fare; and the diner partakes of such as may best accord with his palate. Some of these places are attended day after day by nearly the same persons, while others see a constant succession of new faces. There is one such house near or in Billingsgate, celebrated for the excellence of the *fish*, which forms a component part of the cheer; and which is, on this account, much frequented by the connoisseurs in fish. A public-house (really one) in a street near Covent Garden has an ordinary of three courses, which the lovers of economical good eating, who cannot dine without fish and pastry, delight to haunt. But there are few of these. The *ordinaries* of the days of Elizabeth have left few successors.



[Sir Roger de Coverley.]

SIR ROGER DE COVERLEY.—No. II.

The humour of Addison is manifest in his delineation of Sir Roger's chaplain; and that personage is a pleasing specimen of the unambitious, quiet, placable clergyman of the days of Anne, when there was not a vast amount of zeal in the Church, and perhaps not quite so much piety as an earnest Christian would desire.

"My chief companion, when Sir Roger is diverting himself in the woods or the fields, is a very venerable man who is ever with Sir Roger, and has lived at his house in the nature of a chaplain above thirty years. This gentleman is a person of good sense and some learning, of a very regular life and obliging conversation: he heartily loves Sir Roger, and knows that he is very much in the old knight's esteem, so that he lives in the family rather as a relation than a dependant.

"I have observed in several of my papers that my friend Sir Roger, amidst all his good qualities, is something of a humourist; and that his virtues as well as imperfections are, as it were, tinged by a certain extravagance, which makes them particularly his, and distinguishes them from those of other men. This cast of mind, as it is generally very innocent in itself, so it renders his conversation highly agreeable and more delightful than the same degree of sense and virtue would appear in their common and ordinary colours. As I was walking with him last night, he asked me how I liked the good man whom I have just now mentioned; and without staying for my answer, told me that he was afraid of being insulted with Latin and Greek at his own table; for which reason he desired a particular friend of his at the university to find him out a clergyman rather of plain sense than much learning, of a good aspect, a clear voice, a sociable temper, and, if possible, a man that understood a little of backgammon. 'My friend,' says Sir Roger, 'found me out this gentleman, who, besides the endowments required of him, is, they tell me, a good scholar, though he does not show it. I have given him the parsonage of the parish; and, because I know his value, have settled upon him a good annuity for life. If he outlives me, he shall find that he was higher in my esteem than perhaps he thinks he is. He has now been with me thirty years; and though he does not know I have taken notice of it, has never in all that time asked anything of me for himself, though he is every day soliciting me for something in behalf of one or other of my tenants his parishioners. There has not been a law-

suit in the parish since he has lived among them; if any dispute arises, they apply themselves to him for the decision; if they do not acquiesce in his judgment, which I think never happened above once or twice at most, they appeal to me. At his first settling with me, I made him a present of all the good sermons which have been printed in English, and only begged of him that every Sunday he would pronounce one of them in the pulpit. Accordingly he has digested them into such a series that they follow one another naturally, and make a continued system of practical divinity."

The Spectator goes to church, and hears "the Bishop of St. Asaph in the morning, and Dr. South in the afternoon;" that is, he hears the chaplain read a sermon from Fleetwood's and South's printed collections. He says, "I was so charmed with the gracefulness of his figure and delivery, as well as with the discourses he pronounced, that I think I never passed any time more to my satisfaction." This is to speak of a sermon as he would of a play; which was indeed very much the temper of the Spectator's age. He recommends to the country clergy not "to waste their spirits in laborious compositions of their own;" but to enforce "by a handsome elocution" those discourses "which have been penned by great masters." Whether the advice be judicious or not is scarcely necessary to be discussed. There is something higher to be attained by preaching than enabling a listener to pass his time to his satisfaction; but something even worse may be effected by cold, incoherent, and dull preaching—drowsiness under the shadow of high pews.

Sir Roger's picture gallery is an interesting portion of his ancient mansion. There is one picture in it which has reference to his own personal history:—

"At the very upper end of this handsome structure I saw the portraiture of two young men standing in a river, the one naked, the other in a livery. The person supported seemed half dead, but still so much alive as to show in his face exquisite joy and love towards the other. I thought the fainting figure resembled my friend Sir Roger; and looking at the butler, who stood by me, for an account of it, he informed me that the person in the livery was a servant of Sir Roger's, who stood on the shore while his master was swimming, and observing him taken with some sudden illness, and sink under water, jumped in and saved him. He told me Sir Roger took off the dress he was in as soon as he came home, and by a great bounty at that time, followed by his favour ever since, had made him master of that pretty seat which we saw at a distance as we came to his house. I remembered, indeed, Sir Roger said, there lived a very worthy gentleman, to whom he was highly obliged, without mentioning anything further. Upon my looking a little dissatisfied at some part of the picture, my attendant informed me that it was against Sir Roger's will, and at the earnest request of the gentleman himself, that he was drawn in the habit in which he had saved his master."

But the gallery is chiefly filled with the portraits of the old De Coverleys. There we have the knight in buff of the days of Elizabeth, who won "a maid of honour, the greatest beauty of her time," in a tournament in the tilt-yard. The spendthrift of the next generation—the fine gentleman who "ruined everybody that had anything to do with him, but never said a rude thing in his life," is drawn at full-length, with his "little boots, laces, and slashes." But the real old English country gentleman, who kept his course of honour in evil times—in days of civil commotion, and afterwards in a period of court profligacy—is a character which we trust will never be obsolete:—

"This man (pointing to him I looked at) I take to be the honour of our house, Sir Humphry de Coverley; he was in his dealings as punctual as a tradesman, and as generous as a gentleman. He would have thought himself as much undone by breaking his word, as if it were to be followed by bankruptcy. He served his country as knight of the shire to his dying day. He found it no easy matter to maintain an integrity in his words and actions, even in things that regarded the offices which were incumbent upon him in the care of his own affairs and relations of life, and therefore dreaded (though he had great talents) to go into employments of state, where he must be exposed to the snares of ambition. Innocence of life and great ability were the distinguishing parts of his character; the latter, he had often observed, had led to the destruction of the former, and he used frequently to lament that great and good had not the same signification. He was an excellent husbandman, but had resolved not to exceed such a degree of wealth; all above it he bestowed in secret bounties many years after the sum he aimed at for his own use was attained. Yet he did not slacken his industry, but to a decent old age spent the life and fortune which were superfluous to himself in the service of his friends and neighbours."

The ghosts which used to haunt Sir Roger's mansion were laid, even in his time, by a good orthodox process:—

"My friend Sir Roger has often told me, with a great deal of mirth, that at his first coming to his estate he found three parts of his house altogether useless; that the best room in it had the reputation of being haunted, and by that means was locked up; that noises had been heard in his long gallery, so that he could not get a servant to enter it after eight o'clock at night; that the door of one of his chambers was nailed up, because there went a story in the family that a butler had formerly hanged himself in it; and that his mother, who lived to a great age, had shut up half the rooms in the house, in which either her husband, a son, or daughter had died. The knight, seeing his habitation reduced to so small a compass, and himself in a manner shut out of his own house, upon the death of his mother ordered all the apartments to be flung open, and exorcised by his chaplain, who lay in every room one after another, and by that means dissipated the fears which had so long reigned in the family."

But the belief in apparitions was not passed away. The haunted ruins are described by Addison with his usual grace:—

"At a little distance from Sir Roger's house, among the ruins of an old abbey, there is a long walk of aged elms, which are shot up so very high, that when one passes under them, the rooks and crows that rest upon the tops of them seem to be cawing in another region. I am very much delighted with this sort of noise, which I consider as a kind of natural prayer to that Being who supplies the wants of his own creation, and who, in the beautiful language of the Psalms, feedeth the young ravens that call upon him. I like this retirement the better, because of an ill report it lies under of being haunted; for which reason (as I have been told in the family) no living creature ever walks in it besides the chaplain. My good friend the butler desired me, with a very grave face, not to venture myself in it after sunset, for that one of the footmen had been almost frighted out of his wits by a spirit that appeared to him in the shape of a black horse without a head; to which he added, that about a month ago one of the maids, coming home late that way with a pail of milk upon her head, heard such a rustling among the bushes that she let it fall."

[To be continued.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. II.

Giovanni Cimabue—(*concluded*).

Giovanni of Florence, of the noble family of the Cimabue, called otherwise Gualtieri, was born in 1240. He was early sent by his parents to study grammar in the school of the convent of Santa Maria Novella, where (as is also related of other inborn painters), instead of conning his task, he distracted his teachers by drawing men, horses, buildings, on his school-books: before printing was invented, this spoiling of school-books must have been rather a costly fancy, and no doubt alarmed the professors of Greek and Latin. His parents, wisely yielding to the natural bent of his mind, allowed him to study painting under some Greek artist who had come to Florence to decorate the church of the convent in which he was a scholar. It seems doubtful whether Cimabue did study under these identical painters alluded to by Vasari, but that his masters and models were the Byzantine painters of the time seems to admit of no doubt whatever. The earliest of his works mentioned by Vasari still exists—a St. Cecilia, painted for the altar of that saint, but now preserved in the church of San Stefano. He was soon afterwards employed by the monks of Vallombrosa, for whom he painted a Madonna with Angels on a gold ground, now preserved in the Academy of the Fine Arts at Florence. He also painted a Crucifixion for the church of the Santa Croce, still to be seen there, and several pictures for the churches of Pisa, to the great contentment of the Pisans; and by these and other works his fame being spread far and near, he was called in the year 1265, when he was only twenty-five, to finish the frescoes in the church of St. Francis at Assisi, which had been begun by Greek painters and continued by Giunta Pisano.

The decoration of this celebrated church is memorable in the history of painting. It is known that many of the best artists of the thirteenth and fourteenth centuries were employed there, but only fragments of the earliest pictures exist, and the authenticity of those ascribed to Cimabue has been disputed by a great authority (Rumohr, 'Italienische Forschungen'). Lanzi, however, and Dr. Kugler, agree in attributing to him the paintings on the roof of the nave, representing, in medallions, the figures of Christ, the Madonna, St. John the Baptist, St. Francis, and the four Evangelists. "The ornaments which surround these medallions are, however, more interesting than the medallions themselves. In the lower corners of the triangles are represented naked Genii bearing tasteful vases on their heads; out of these grow rich foliage and flowers, on which hang other Genii, who pluck the fruit or lurk in the cups of the flowers." (Kugler.) If these are really by the hand of Cimabue, we must allow that here is a great step in advance of the formal monotony of his Greek models. He executed many other pictures in this famous church, "con diligenza infinita," from the Old and the New Testament, in which, judging from the fragments which remain, he showed a decided improvement in drawing, in dignity of attitude, and in the expression of life, but still the figures have only just so much of animation and significance as are absolutely necessary to render the story or action intelligible. There is no variety, no express imitation of nature. Being recalled by his affairs to Florence, about 1270, he painted there the most celebrated of all his works, the Madonna and Infant Christ, for the church of Santa Maria Novella. This Madonna, of a larger size than any which had been previously executed, had excited in its progress great curiosity and interest among his fellow-citizens, for Cimabue refused to uncover it to public view: but it happened about that time that Charles of Anjou, brother of Louis IX., being on his way to take possession of the kingdom of Naples, passed through Florence, and was received and feasted by the nobles of that city; and among other entertainments, they conducted him to visit the atelier of Cimabue, which was in a garden near the Porta San Piero: on this festive occasion the Madonna was uncovered, and the people in joyous crowds hurried thither to look upon it, rending the air with exclamations of delight and astonishment, whence this quarter of the city obtained and has kept ever since the name of the 'Borgo Allegri.' The Madonna, when finished, was carried in great pomp from the atelier of the painter to the church for which it was destined, accompanied by the magistrates of the city, by music, and by crowds of people in solemn and festive procession. This well-known anecdote has lent a venerable charm to the picture, which is yet to be seen in the church of Santa Maria Novella; but it is difficult in this advanced state of art to sympathise in the *naïve* enthusiasm it excited in the minds of a whole people six hundred years ago. Though not without a certain grandeur, the form is very stiff, with long lean fingers, and formal drapery, little varying from the Byzantine models; but the Infant Christ is better, the angels on either side have a certain elegance and dignity, and the colouring in its first freshness and delicacy had a charm hitherto unknown. After this Cimabue became famous in all Italy. He had a school of painting at Florence and many pupils, among them one who was destined to take the sceptre from his hand and fill all Italy with his fame—and who, but for him, would have kept sheep in the Tuscan valleys all his life—the glorious Giotto, of whom we are to speak presently. Cimabue, besides being a painter, was a worker in mosaic and an architect: he was employed, in conjunction with Arnolfo Lapi, in the building of the church of Santa Maria dell' Fiore, at Florence. Finally, having lived for more than sixty years in great honour and renown, he died at Florence about the year 1302, while employed on the mosaics of the Duomo of Pisa, and was carried from his house in the Via del Cocomero to the church of Santa Maria dell' Fiore, where he was buried: the following epitaph was inscribed above his tomb:—

"Credidit ut Cimabos picturæ castra tenere;
Sic tenuit vivens—nunc tenet astra poli."*

Besides the undoubted works of Cimabue preserved in the churches of San Domenico, la Trinità, and Santa Maria Novella at Florence, and in the Academy of Arts in the same city, there are two Madonnas in the Gallery of the Louvre (Nos. 950, 951), recently brought there; one as large as life, with angels, originally painted for the convent of S. Francis at Pisa, the other of a smaller size. From these productions we may judge of the real merit of Cimabue. In his figures of the Virgin he adhered almost servilely to the Byzantine models. The faces are ugly and vapid; the features elongated; the extremities meagre; the general effect flat: but to his heads of prophets, patriarchs, and apostles, whether introduced into his great pictures of the Madonna or in other sacred subjects, he gave a certain grandeur of expression and largeness of form, or, as Lanzi expresses it, "un non so che di forte e sublime," in which he has not been greatly surpassed by succeeding painters; and this energy of expression—his chief and distinguishing excellence, and which gave him the superiority over Guido of Sienna and others who painted only Madonnas—was in harmony with his personal character. He is described to us as exceedingly haughty and disdainful, of a fiery tempera-

* Cimabue thought himself master of the field of painting: While living, he was so—now, he holds his place among the stars of heaven.

ment, proud of his high lineage, his skill in his art, and his various acquirements, for he was well studied in all the literature of his age. If a critic found fault with one of his works when in progress, or if he were himself dissatisfied with it, he would at once destroy it, whatever pains it might have cost him. From these traits of character, and the bent of his genius, which leaned to the grand and terrible rather than the gentle and graceful, he has subsequently been styled the Michael Angelo of his time. It is recorded of him by Vasari, that he painted a head of St. Francis *after nature*, a thing, he says, till then unknown; but the earliest head after nature which remains to us was painted by Giunta Pisano, forty years before. It was the portrait of Frate Elia, a monk of Assisi. Perhaps Vasari means that the San Francesco was the first representation of a sacred personage for which nature had been taken as a model.

The portrait of Cimabue prefixed to this essay (No. 394) is copied from a tracing of the original head, painted on the walls of the Chapel degli Spagnuoli, in the church of Santa Maria Novella, by Simone Memmi of Sienna, who was at Florence during the lifetime of Cimabue, and must have known him personally. This painting, though executed after the death of Cimabue, has always been considered authentic as a portrait: it is the same alluded to by Vasari, and copied for the first edition of his book. The composition beneath the portrait is copied from an engraving, in the 'Histoire de l'Art par les Monumens,' of one of the frescoes in the church of Assisi which are attributed to Cimabue. The subject is that which is commonly called "The Deposition from the Cross," representing the Saviour dead, sustained by Joseph of Arimathea and St. John, and bewailed by the Virgin and Mary Magdalen. The angels are taken from Cimabue's 'Madonna dei Angeli:' in the original picture there are three on each side, ranged one above another in a line, with no attempt at grouping, and little variety of expression.

Cimabue had several remarkable cotemporaries. The greatest of these, and certainly the greatest artist of his time, was the sculptor Nicola Pisano. The works of this extraordinary genius which have been preserved to our time are so far beyond all contemporary art in knowledge of form, grace, expression, and intention, that, if indisputable proofs of their authenticity did not exist, it would be pronounced incredible. On a comparison of the works of Cimabue and Nicola Pisano, it is difficult to conceive that Nicola executed the bas-reliefs of the pulpit in the Cathedral of Pisa while Cimabue was painting the frescoes in the church of Assisi. He was the first to leave the stiff monotony of the traditional forms for the study of nature and the antique. The story says, that his emulative fancy was early excited by the beautiful antique sarcophagus on which is seen sculptured the Chase of Hippolytus. In this sarcophagus had been laid, a hundred years before, the body of Beatrice, the mother of the famous Countess Matilda: in the time of Nicola it was placed, as an ornament, in the Duomo of Pisa; and as a youth he had looked upon it from day to day, until the grace, the life and movement of the figures struck him, in comparison with the barbarous art of his cotemporaries, as nothing less than divine. Many before him had looked on this marble wonder, but to none had it spoken as it spoke to him. He was the first, says Lanzi, to see the light and to follow it.* There is an engraving after one of his bas-reliefs—a Deposition from the Cross, in Ottley's 'School of Design,' which should be referred to by the reader, who may not have seen his works at Pisa, Florence, Sienna, and Orvieto.

Another cotemporary of Cimabue, and his friend, was Andrea Tafi, the greatest worker in mosaic of his time. The assertion of Vasari, that he learned his art from the Byzantines, is now discredited; for it appears certain that the mosaic workers of Italy (the forerunners of painting) excelled the Greek artists then, and for a century or two before. Andrea Tafi died, very old, in 1294; and his principal works remain in the Duomo of St. Mark at Venice, and in the church of San Giovanni at Florence. Another famous mosaic-worker, also an intimate friend of Cimabue, was Gaddo Gaddi—remarkable for being the first of a family illustrious in several departments of art and literature. It must be remembered that the mosaic-workers of those times prepared and coloured their own designs, and may therefore take rank with the painters.

Further, there remain pictures by painters of the Sienna School which date before the death of Cimabue, and particularly a picture by a certain Maestro Mino, dated 1289, which is spoken of as wonderful for the invention and greatness of style. Another painter, who sprung from the Byzantine School, and surpassed it, was Duccio of Sienna, who painted from 1282 (twenty years before the death of Cimabue) to about 1339, and "whose influence on the progress of art was unquestionably great." A large picture by him, representing, in many compartments the whole history of the Passion of Christ, is preserved at Sienna: it excited, like Cimabue's Madonna, the pride and enthusiasm of his fellow-citizens, and is still regarded as wonderful for the age in which it was produced.

All these men (Nicola Pisano excepted) still worked on in the trammels of Byzantine art. The first painter of his age who threw them wholly off, and left them far behind him, was Giotto.



[Madonna and Infant Christ.]

* Rosini, in his 'Storia della Pittura,' has rectified some errors into which Vasari and Lanzi have fallen with regard to the dates of Nicola Pisano's works—it appears that he lived and worked so late as 1290.

MINING UNDER THE SEA.

Among the remarkable circumstances connected with mining—an occupation which holds a place aloof from almost every other—few are more startling to a general reader than the carrying on of excavations beneath the sea. That a shaft should be sunk two, three, five, or twelve hundred feet deep, on the dry land, as a means of getting at the valuable mineral beneath, is in itself matter for wonder; but that horizontal galleries should be worked from thence beneath the bed of the sea, seems an act of peculiar boldness.

A few scattered notices are to be met with in the early writers, tending to show that the operations of mining were occasionally carried on so near the edge of the sea, or even under the bed of the sea, as to lead to inundations which have destroyed the mines themselves. In our own country instances of an analogous kind are not rare. At the Huel Mine in Cornwall, some years back, a 'lode,' or vein of metal, was followed by the pickaxe of the miner to such an extent under the bed of the sea, and the men, by working away too greedily at the roof of their mine, had reduced the thickness between it and the sea above so greatly, as to lead to fears of an awful disrupture; and the workings in that direction were then stopped. At Whitehaven there are coal-mines which have for many years been worked under the bed of the sea.

Sometimes the irruption of water arises from a river instead of the open sea, according to the direction which the galleries of the mine take, and the thickness of earth between them and the water. Mr. Holland, in his 'History of Fossil Fuel,' relates a signal instance of such an irruption. In 1833, while two gentlemen were fishing on the banks of the Garnock in Scotland, a slight disturbance was observed to take place in the current of the river, which they at first supposed to have been occasioned by the leap of a salmon; but the gurgling motion which succeeded led them to conclude that the river had broken into the coal-mines which surrounded the place on which they stood. They immediately hastened to the nearest pit-mouth, gave an alarm, and measures were taken to succour the men below. The latter had heard the rushing of the water, and hastened to the shaft; but before they had reached it, every one was immersed up to the neck in water. The manager of the works then tried a plan which Mr. Brunel has often adopted in the irruptions at the Thames Tunnel, viz., to endeavour to cover the cavity in the bed of the river with clay and other materials; but the flood of water was too violent, and the stream continued to flow into the mine. At first the water entered the mine without much agitation at the surface; but in the following day the orifice became greatly larger, and the whole body of water rushed in with such fearful violence as to leave the bed of the river momentarily nearly dry for a mile on either side of the aperture; and the fishes were seen leaping about in every direction. At the return of the tide a renewed body of water was supplied, which poured in as before, until the whole workings of the pits, which extended several miles, were completely filled. The pressure in the pits became so great, from the immense weight of water impelled into them, that the confined air, which had been forced back into the high workings, burst through the surface of the earth in a thousand places; and many acres of ground were to be seen all at once bubbling up like the boiling of a cauldron. Large bodies of sand and water were thrown up for hours together; and the whole of the mining operations were stopped, by which six hundred persons were at once deprived of employment.

But perhaps the most notable instance of submarine mining ever attempted was one in which the vein of worked mineral was not only under the bed of the sea, but the shaft was actually sunk in the sea itself! This was the *Wherry* tin-mine in Cornwall. Dr. Davy in his 'Life of Sir Humphry Davy,' after detailing the circumstances under which the philosopher became acquainted with Mr. Gregory Watt (James Watt's son) at Penzance, and describing the rambles which they took together, says:—"The Wherry Mine, the shaft of which was in the sea, approached by a long wooden bridge, and the workings of which were entirely under the sea, at the short distance of about a mile from Penzance, was a favourite place of resort with them. It afforded an unusual variety of minerals, and, from its peculiarities, could not fail to excite a deep interest in their minds, as a struggle of art against nature, in which a victory was gained over the elements by means of the most wonderful invention of the age, the steam-engine,—which, only a short time before, had been perfected by the distinguished father, the elder Mr. Watt; and this very engine, erected on the shore, acting at a distance over the surface of the sea, and drawing up water from beneath its bed, was one of the earliest that had been introduced into Cornwall."

Mr. John Hawkins, in a paper in one of the early volumes of the Cornwall Geological Society's 'Transactions,' gives an account of the origin and construction of the Wherry Mine, so interesting as to rank it almost among the romance of mining. The first attempts to work this singular mine are said to have been made about the beginning of the last century, when, many small veins of tin being observed to traverse a rocky shoal which was exposed to view at low-water, some persons were induced to make it an object of mining adventure. How long they persevered in the enterprise, and what were the mechanical aids of which they availed themselves, are not known; but the works, after being sunk to the depth of a very few fathoms in the rock, were finally abandoned.

About the year 1778 a poor miner belonging to the parish of Breage, whose name was Thomas Curtis, had the boldness to renew the attempt, with a capital of only ten pounds at his command. The nature of the difficulties with which he had to contend may be judged from the following details:—The distance of the shoal from the neigbouring beach at high-water is about a hundred and twenty fathoms; and this, in consequence of the shallowness of the beach, is not materially lessened at low-water. It is calculated that the surface of the rock is covered about ten months in twelve, and that the depth of water on it at spring-tides is nineteen feet. The prevailing winds occasion a very great surf even in summer; but in winter the sea bursts over the rock in such a manner as to render all attempts to carry on mining operations unavailing.

At such a spot did Curtis proceed to sink a mine. As the work could be prosecuted only during the short period of time when the rock appeared above water (a period which was still further abridged by the necessity of previously emptying the excavation), three summers were consumed in sinking the pump-shaft, a work of mere bodily labour. The use of machinery then became practicable, and a frame of boards being applied to the mouth of the shaft, it was cemented to the rock by pitch and oakum, made water-tight in the same way, and carried up to a sufficient height above the highest spring-tide. To support this boarded turret, which was twenty feet high above the rock, and twenty-five inches square, against the violence of the surge, eight stout bars of iron were applied in an inclined direction, four of them below, and four of extraordinary length and thickness above. A platform of boards was then lashed round the top of the turret, supported by four poles, which were firmly connected

with these rods. Lastly, upon this platform was fixed a windlass for four men.

These difficult and slowly-conducted preparations being made, it was thought that the miners would be enabled to pursue their operations at all times, even during the winter months, whenever the weather was not particularly unfavourable; but as soon as the excavation was carried to some extent in a lateral direction, this was found to be impossible, for the sea-water penetrated through the fissures of the rock, and in proportion as the workings became enlarged, the labour of raising the produce to the mouth of the shaft increased. Their predecessors, as well as themselves, had carried on their excavations too near the surface, which made the rock not only more permeable, but less able to resist the immense pressure of water at high tide, so that it became necessary to support it with large timbers. To add to this disappointment it was found impossible to prevent the water from forcing its way through the shaft during the winter months, or, on account of the swell and surf, to remove the tin-ore from the rock to the beach opposite. The whole winter, therefore, was a period of inaction, and it was not before April that the regular working of the mine could be resumed. Nevertheless, the short summer interval which was still allowed for labour below ground sufficed most richly to reward the bold and persevering projector, and to give his mine the reputation of a very profitable adventure.

Curtis, as has been before stated, commenced this daring undertaking with the support only of his own slender capital of a few pounds, but he appears soon to have been joined by others who brought money into the enterprise; and Curtis seems never from the first to have entertained any doubt as to the ultimate success of his attempt. By the year 1791 the operations had reached the following extent:—The shaft was sunk to about twenty-six feet in the rock; and the breadth of the workings was eighteen feet. The roof of the workings was brought within three or four feet of the water in some places. Twelve men were employed for two hours at the windlass in hauling up the water; while six were working in the mine below, and the men afterwards worked for six hours on the rock, making eight hours in all. Thirty sacks of tin-ore were broken on an average every tide; and ten men, in the space of six months, working about one-tenth of that time, procured about 600*l.* worth. Besides the small veins of tin which ran through this rock, its whole mass was impregnated with tin to such a degree, as to be worth the expense of raising.

In 1792, Mr. Davies Gilbert, writing to Mr. Hawkins respecting this sea-girt mine, said:—"The course of stanniferous porphyry near Penzance (the Wherry) promises to make a very great mine. There are indications of the tin being continued to a great extent in both directions, and the bottoms are growing longer, and remain rich. A house near the green, built with fragments of this stone, which were probably picked up on the shore, or broken from the top of the rock, is, I hear, to be pulled down and rebuilt with other stone, for the sake of its tin. An adventurer told me that three thousand pounds' worth of tin had been raised from this extraordinary mine in the course of this present summer."

In a subsequent letter, the same gentleman stated that a steam-engine was at that time being erected on the adjacent shore, which was to be connected with the mine by a wooden bridge, to serve as a communication till the engine-shaft had been sunk sufficiently deep, and a drift worked out to the mine as a stage for supporting the working-rods. The bridge, thus constructed, answered also the purpose of conveying the ore to the shore.

Thus did this most singular mine continue to be worked, till it had yielded seventy thousand pounds' worth of tin-ore, when a period was put to its usefulness, almost as remarkable as the circumstances connected with its origin. An American vessel broke from its anchorage in Gwavas Lake (the name of a small bay or anchorage near Penzance), and striking against the stage constructed out in the sea on the shoal, demolished the machinery, filled the mine with water, and thus put an end to the adventure.

Mr. Hawkins, in reflecting on this singular enterprise, makes the following remarks:—"On a review of the improvements which have taken place in our machinery within the last forty years, I am inclined to think that the spirit of mining enterprise, to which they have imparted so much animation, will soon assume a character of still greater audacity. Perhaps when the veins are exhausted, which lie within the boundary of our sea-girt peninsula, we shall turn our attention to those which extend in the same direction beneath the bed of the ocean; nor, when we consider the increasing depth of our mines, can that period be very distant. Our submarine works will then form a new epoch in the history of mining, and by calling forth still greater exertions of skill and industry, demonstrate in a more striking manner the powers of the human intellect."

ARTIZANS AND APPRENTICES, ON THE CONTINENT.

In England, whatever may be the state of depression in which any branch of trade or manufacture is placed at an unfavourable period, the workmen still remain pretty constantly located in one spot. They may be pinched by abject poverty, or may be reduced to only half their wonted amount of wages, and we hear of their distresses, their complaints, their solicitations for relief, either political or social: but they rarely wander from town to town; they have their associations and local attachments which induce them to cling to the familiar scenes of their life, even when they have little else to cling to.

The general temperament of the people may be adduced as one cause for this fixedness. The English are not so migratory as the Irish or the Scotch. The Irishman, in the labouring departments of life, and the Scotchman in almost every department, will leave his country to earn a living in a foreign place, perhaps to return and end his days in the country which gave him birth, perhaps to take up his permanent abode in the country of his adoption. The working-classes in England are not distinguished by this tendency. The Spitalfields weaver still continues in Spitalfields, let trade fall as it may; he may be half-starved, or he may be dependent on the charity of benevolent persons; but there he remains, linked to the spot which has contained his poor well-worn loom, his birds, and his flowers, from his boyhood. So it is in other parts of England. The workmen, as a class, show no tendency to wander from town to town, or to leave England for foreign countries: individuals do so in every occupation; but there seems to be, among our countrymen generally, or at least among the working population, a sort of attachment to *home*, however miserable, which runs counter to a rambling and unsettled life.

A 'tramp,' or travelling migratory workman, is seldom looked upon in a favourable light in this country. He is a kind of homeless wanderer, unattached to any specific locality; whereas on the Continent an itinerant workman is by no means a rare personage. Mr. Symonds, in his 'Arts and Artizans,' while speaking of the condition of the weavers in

Scotland, has occasion to allude, in the following terms, to a class of men such as we are now speaking of. It may be necessary to say that Mr. Symonds gathered his information while acting as Assistant Commissioner on the Hand-loom Weavers' Enquiry:—"The most dissolute and immoral class of weavers in Scotland are an itinerant body called 'tramps,' of whom at least two-thirds are said to be Irish. They take looms as journeymen from the master of a shop, who procures webs for them from the manufacturers; and not unfrequently, after they are three-quarters woven, they cut them out of the loom, and decamp with them. They are notorious as the most idle, profligate, noisy, drunken, and quarrelsome set of people in the weaving districts. Embezzlement of weft is the chief vice of the weavers; it is 'the sin which most easily besets them;' and that it is carried on to a very considerable extent there appears no question." Mr. Symonds proceeds to show the manner in which this system injures the honest weaver, by enabling the fraudulent one to undersell him in the market; and further describes how women, employed by certain persons in the busy seats of manufacture, 'tramp' about the country, and obtain a sale in the weaving districts for silk-yarn which has been dishonestly obtained.

This, however, is the worst phase of 'tramping.' It is downright roguery, which is by no means necessarily connected with the condition of a migratory workman. There are individuals, if not classes, constantly roaming about England, the object being to obtain a living by honest labour in any town where the latter is to be obtained. Still, however, this, as we have before observed, is not a characteristic of English workmen; and we must go to the Continent to observe the system in all its remarkable features, both as respects apprentices or learners, and journeymen.

Switzerland and Germany, as we shall presently describe, are the countries wherein this system is principally followed. In France it is not so largely practised. The various classes of workmen are not connected and classified exactly as in England, but they exhibit peculiarities worthy of notice, which will serve to show the contrast not only between the French and the English, but also between the French and the German workmen. The silk-weavers of Lyons, one of the most important operative bodies in France, are thus depicted by M. Monfalcon, in his 'Histoire des Insurrections de Lyon, en 1831 et en 1834.' The silk-weavers of Lyons are divided into three classes, whom we may, in English parlance, call small masters, workmen, and apprentices; besides the manufacturers whose capital and commercial connections set all to work. The first of these are the *chefs d'ateliers*, or men who have three, four, or half a dozen looms, and a fixed residence. The second class go by the name of *compagnons*, they work some of the looms of the *chefs d'ateliers*, with whom they live, having no house-rent to pay, and no responsibility of any sort. These men and women (for both sexes are included) receive half of the money gained by the looms they work, the other half going to the *chef d'atelier* for wear and tear of machinery, house-rent, risk, &c. M. Monfalcon says that these *compagnons* in general have no activity and no spirit of order: they compose a floating and very unequal population. When there is plenty of work, the country in the neighbourhood of Lyons furnishes many workmen, and formerly a great number used to migrate from Piedmont and Savoy. When the silk trade is dull, most of these *compagnons* leave the town, and turn their hands to something else. The system of *compagnonage* is deemed by thinking men a great evil at Lyons; for the workmen are, in general, unintelligent or imprudent men, who, either through want of ability in their trade, or through want of economy, have never been able to get together the very small capital necessary to buy a loom or two of their own. The *apprentices* are generally youths from fifteen to twenty years of age, who are taught their business by the *chefs d'ateliers*, with whom and for whom they work. Besides these, there are a younger kind of workpeople called *lancers*, mere children, whose work is to throw (*lance*) the shuttle in certain pattern silks. M. Monfalcon gives a sad picture of these youths and boys. "Generally speaking," he says, "neither *apprentices* nor *lancers* have received the least rudiment of education. They are turbulent on days of riot and revolt, through a mere love of noise. But these boys were seen during the three days of November, 1831 (the period of a dreadful riot at Lyons), creeping among the horses, and aiming blows at the dragoons, which were so much the more dangerous as it was impossible to foresee them. During the six days of April, 1834 (when a second riot took place in the same city), many of them explored the streets of Lyons armed with pistols or bad guns. These unfortunate little wretches, during the whole of our sad collisions, have shown the greatest disregard of danger, and, at times, the most complete contempt of life."

The migratory workmen and apprentices of Germany and Switzerland will afford us details of a less painful nature. While Mr. Symonds was collecting information on the Continent, in reference to one of the Government Commissions, he had an opportunity of becoming acquainted with the peculiar *wander-schaft* system of Germany and Switzerland. In many parts of these countries there is an immemorial usage, that no apprentice can obtain his freedom, and become a master, until he has spent a certain number of years under a kind of itinerant probation, and in following his avocation beyond his native country. He is furnished on setting out with a book, in which his various masters insert certificates of his service and conduct. This book is called his 'wander-buch.' The rambler is generally assisted not only by the trade to which he belongs, in towns where there is no employment for him, but by the donations of travellers. Mr. Symonds was frequently asked, by well-dressed young men, with knapsacks on their backs, for money on the road. On one occasion, the 'wanderer' had been through Switzerland, part of Bavaria, and Wirtemberg, and was then on his way home to Baden: he spoke French admirably, and gave a lucid and excellent account of the most salient features in the condition of the workmen in the different countries he had been in. Mr. Symonds comments on the bad effects which this begging system must have a tendency to produce in the manly and independent tone of feeling on the part of the young men, though it must be remembered that public begging is in every other case most strenuously prevented in Germany, and that they only are licensed to ask for assistance. On the other hand he points out the advantages which accrue in other respects, giving to them a range of knowledge and varied acquirements such as it would be vain to look for in a similar class in England.

Mr. Symonds quotes a letter which he received from a gentleman in Austria, giving further details in connection with this matter. "You are aware that here, as over almost every part of Germany, the trades of tailors, shoemakers, furriers, &c. are carried on by masters who employ journeymen on the 'wanderschaft,' as it is called, that is to say, workmen who go from town to town, stay a winter at one place, a summer at another, and receive generally, besides board and lodging, a certain sum weekly. This is usually about a dollar to three florins (three to five shillings); tailors, 20 per cent. less. When they go

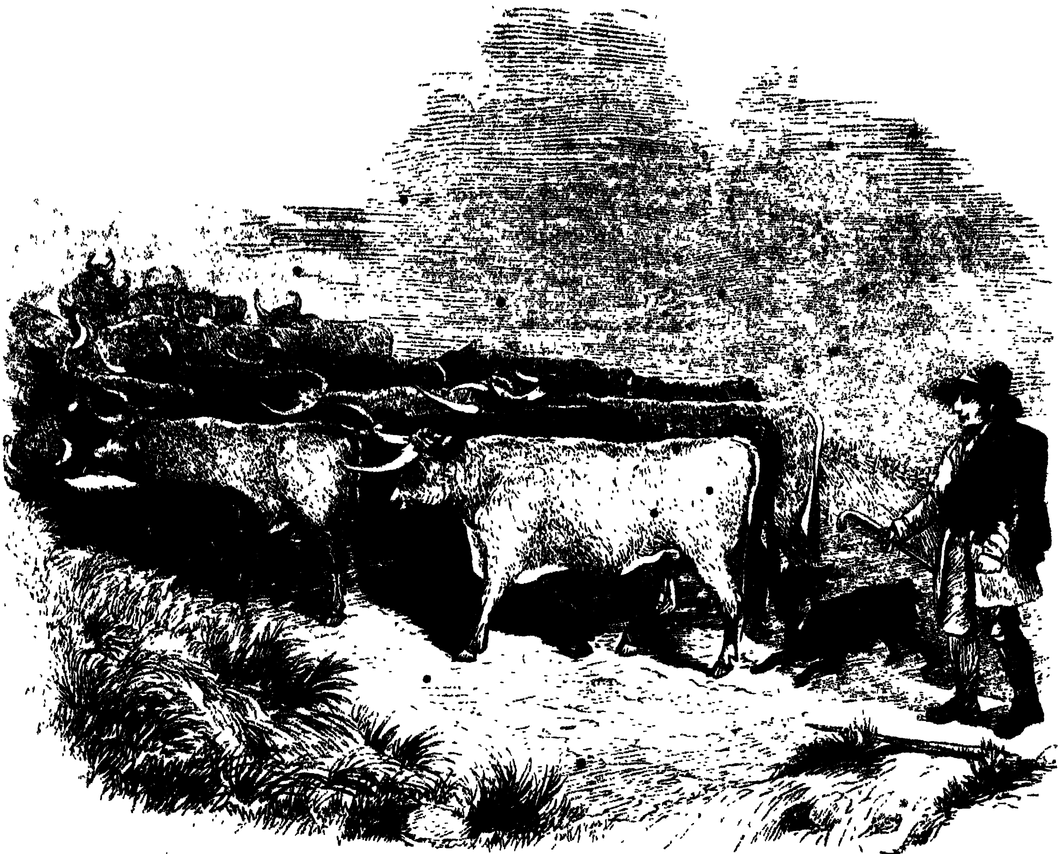
from one town to another, it is a recognised privilege of theirs, from time immemorial, to ask assistance from passers-by as they travel along, and at the towns they pass through; and at every town there is a 'herberge,' as they call it (auberge?), where the master of the inn has agreed with the guild of that trade to lodge them at a very low rate; so that when they arrive, they immediately ask for the tailors', or shoemakers', &c. 'herberge,' and by that means can travel very cheaply: a very bad system, which was originally intended to give them an opportunity of improving themselves in the knowledge of their art; but it is peculiarly favourable to vagabondizing. At the moment I am writing this, a silk-weaver has applied to me for assistance. From his passport I see he has been in Italy, and then in Hungary, and is returning to the Grand-Duchy of Nassau, whence he came."

Most of the trades in Austria and Prussia are said to be supplied more or less by itinerant journeymen; and the whole social system of a workman's family is very different from what is observed in England. The Vorarlberg (a part of the Austrian dominions), containing about ninety thousand inhabitants, sends out masons and house-builders to nearly the whole of Switzerland, and the neighbouring provinces of France. They leave early in spring, and live very sparingly during the summer, cooking for themselves a kind of pudding or soup of flour and Indian corn, which, with bread, and now and then a glass of wine (a cheap beverage in those countries), suffice for their nourishment. They return home in autumn, where they have little to do during winter, excepting to fell wood, &c. in the forests, and other chance work. The children leave the country at the same time in thousands, to herd cattle in Suabia and Bavaria; receiving perhaps twenty shillings, besides board and lodging, for their services, a suit of home-spun linen clothes, and two pair of shoes, and perhaps a bag of flour, which they manage to cook for themselves on the way, and return with nearly the whole of their earnings. While the strong and healthy men are those working as journeymen in foreign countries, and the children go out to 'farm-service' for about the same space of time, the women and old men cultivate the land, while the girls weave—all the branches of the family meeting again in the autumn.

How different is all this from the usages presented among the bulk of English artizans!

Dutch Settlers at the Cape of Good Hope.—In every farm-house the style of living, the hours, and customs, appear nearly, if not entirely, similar; sufficient for the more wealthy, and within the means of the less opulent, but little room is thus afforded for the exercise of that idle vanity of display, which, preferring empty show to solid comfort, is productive of so much misery in our own country. There is scarcely any variety even in the construction of the houses; all have the 'stoep,' or raised foot pavement, running along the front, which is to the Cape Boer what the 'hearth' is to the Englishman, the abode of the penates, the seat of honour of the house. Any disrespect shown to this sacred spot is much felt by them; any offence or insult is greatly aggravated by the stoep being made the theatre of its perpetration; and I have known considerable irritation caused by a stranger, ignorant of their peculiarity in this matter, inadvertently bringing his horse upon it. On entering is the hall, in which the family sit, containing two or three small tables and a few venerable-looking chairs, with moveable cushions very softly stuffed. Immediately facing the hall, and generally communicating with it by folding doors, is the 'eating-room;' while to the right and left, also opening into the hall, are two bed-rooms, one of which is always reserved as the best or guest's room; behind are the other two bed-rooms and offices. All these rooms are commonly paved with large square bricks, painted or enamelled with some sort of composition, which contributes to ornament as well as cleanliness, though its smoothness renders necessary some care in walking upon it. In the spare room I always noticed, in addition [illegible] old wardrobe: the [illegible] sheets white as snow, and [illegible] they welcome the stranger [illegible] rivalling in this respect the far-famed hospitality [illegible] though their portion may be scanty [illegible] it is not less abundant. [illegible] early, and before six the 'vrow' [illegible] her shining brass kettle [illegible] brazier of charcoal which supports it; and [illegible] proceeds to dispense its contents to all comers. At eight the 'vrow,' respectfully approaching her husband, who has returned from his work, notifies that breakfast is on table. Of this meal she herself seldom partakes, at least not in company with the other members of the family; [illegible] she prepares the tea and coffee, which a female servant hands to the rest of the party, while she herself rises and presents a cup to her husband. The breakfast table is well covered with eggs, ham, biltongue or cured [illegible] butter, and excellent home-made brown bread; [illegible] by the father to any guest unless a very aged person, as a grandfather or grandmother, be present, in which case they ask the blessing. Breakfast concluded, all depart to their respective tasks, from which they return at twelve to dinner: this meal consists of substantial joints of [illegible] mutton, and frequently a couple of fowls, [illegible] and excellent wholesome unadulterated wine; [illegible] but all is put on the table at once. The dinner service is invariably white, and, as well as the table-cloth, is always most scrupulously clean. In large families, where the father has sons of such an age as to be able to superintend the business of the farm, he usually indulges himself with a siesta, and contrives to be in or about the house about three o'clock, at which hour a servant hands round a tray containing small cups of tea, with milk, frequently in a silver ewer, and two cut-glass jars, one filled with sweetmeats, and the other with water, in which stand two or three very small silver forks, with which they help themselves to the confection, and replace them in the water. The labour of the day being over, about seven of the family assemble in the hall, and a glass of wine is handed to each; few speak except the master of the house, and he is listened to with respect. A woman's voice is seldom heard, save in answer to a question. At eight the vrow announces that supper is ready: this meal much resembles the dinner in its component parts; it is, perhaps, their principal meal: about nine a small glass of spirits, which they term a 'sopee,' is brought to each of the men, and the party separates for the night. The manners of these hospitable and simple people are instinctively and innately polite: with less action than the French, they display more warmth than the English, and never did any class of men make on my mind a more favourable impression than the Dutch Boers of the Cape Colony.—*Baynes's Notes and Reflections during a Ramble in the East.*

The Yang-Tse-Keang River.—Unless the Mississippi and Missouri are to be considered as one river, then the Amazon being the first, the Yang-tse-Keang is the second river in the world in point of length. If you consider, however, the countless canals which it supplies with water, to keep in constant irrigation the surrounding country, the commerce which it carries on its breast, the fruitfulness displayed on its banks, where the richness of the foliage and the greenness of the herbage are quite astonishing; if, lastly, you add the depth and volume of its waters, it has some claims, I conceive, to the very first place among the rivers of the globe. In going up the river, nautically speaking, the left, geographically the right bank of the river, is the most picturesque side. The ranges of hills were frequently quadruple, the nearest sweeping down gracefully and gradually towards the river. The other side for a long way is very flat. The neat little villages were frequently, if not generally, placed in an angle formed by a canal and the great river. The villagers as we passed crowded towards the mouth of their canals. Great, doubtless, was their astonishment at the noble, and, to them, novel sight of a British fleet of war-ships and transports, the latter glistening with scarlet. None of these men had ever seen a ship more powerful or larger than a Chinese junk of war. No greater astonishment would probably have been felt by a pigmy of yore at first view of any of the giants, "men of renown," who lived in "those days."—*The Last Year in China.*



[English Cattle Drover.]

CATTLE-DROVERS.

The industry required in producing the common food of the people, although simple and often rude in its nature, involves extensive and varied arrangements, and a division of employments nearly as striking as the complicated processes which excite so much admiration in manufactures. How varied are the contrasts between the different classes engaged in raising food and those who are employed in producing clothing and shelter, and yet the humblest services in each of these departments of industry are indispensable and invaluable. The subject of the cut leads us more immediately to the consideration of one of the useful occupations connected with the supply of animal food. The number of cattle in Great Britain is estimated at eight millions, and their value, at 10*l.* per head, amounts to the large sum of eighty millions sterling. One-fifth of the above-mentioned number, or 1,600,000, is annually consigned to the butcher. His are the last, except those of the cook, of a long chain of operations. London requires a supply of about 160,000 head of cattle annually, and by far the larger proportion are reared in the northern part of the island, though they are fattened in the south. The rich lands are more profitably employed than in supplying food to young beasts which are hardy enough to thrive on the coarse grasses of uncultivated wastes. Hence, as the most profitable distribution of the soil, lean cattle are the riches of a country which is not adapted to cultivation; but when required for the butcher, then the produce of the best soils may be advantageously employed in fattening them. In the districts where they are reared, the rent of the land is paid out of the profits of the live stock, for they are the chief wealth of the tenant, but in those where they are fattened rent is derived from a greater variety of sources, and the manure obtained from stall-feeding constitutes no inconsiderable proportion of the profit, for without this restorative the soil would soon become less productive. No plan therefore is so advantageous or economical as that under which the uncultivated lands are devoted to the rearing, and the richer soils to the fattening of stock. On their road from Scotland to the midland, eastern, and southern counties of England the services of a particular class of men is a distribution of labour equally convenient. The farmer of Norfolk need not leave his farm on a distant journey to the north, but purchases lean stock at the fairs in his own neighbourhood, to which the cattle are driven by those who make it their sole business. In the 'Survey of Dumbartonshire' there is an account of the progress of the cattle on their journey:—"The cattle bred in the West Highlands are, at the age of two years, or two years and a half, removed into Dumbartonshire and the neighbouring counties. At three years old they are carried to the northern counties of England, and so by degrees southward, enjoying at each remove a milder climate and a richer pasture than before, till they attain their full size, and reach the butcher in prime condition." The pastures on which they are supported before they commence their journey to the south are very coarse, and only cattle which have never known better fare can pick up a living upon them. After feeding here during the winter, they are sold in April or May, and it is evident that if they have sim-

ply not deteriorated during the severe season, they will, when that is over and there is the near prospect of abundant food from the summer pastures, fetch a higher price than was given for them before the winter with its possible scarcity. During summer they get into better condition, and are purchased by buyers from districts where turnips are cultivated, on which root and hay they are fed in the second winter. In spring they perhaps reach the rich pastures of Lincolnshire, Northamptonshire, or the marshes of Essex, and are put upon them for the early grass, on which they soon become fat. For stall-feeding, they are bought lean at the great autumn fairs and fattened during the winter. The prices vary in different years; but the proportions remain much the same, and the small Scotch cattle usually average per head, at fifteen months, 3*l.* to 4*l.*; at two years, 6*l.* or 7*l.*; at three or three and a half, 10*l.* or 12*l.* upwards. Every hand through which they pass derives a profit, as advantageous to the public interest as it is to his own.

The great trysts or fairs in Scotland for the sale of cattle exhibit the wealth of pastoral districts to great advantage. Those held at Falkirk are the largest, from its central situation, both for the breeders in the north and west of Scotland, and for the buyers for the English market. Every variety of cattle bred in Scotland, including those from the Western Islands and the Hebrides, are to be found at the Falkirk trysts, which are held on different days in the months of August, September, and October, the last being the largest, as the breeders must then dispose of all the stock which they do not intend to keep through the winter. At the October tryst there have been 50,000 cattle, 30,000 sheep, and 3000 horses on sale; and the number sold at the three together is about 80,000 cattle, 50,000 sheep, and 5000 horses, which fetch an aggregate sum of 650,000*l.*, averaging the cattle at 7*l.* each, the sheep at 18*s.*, and the horses at 10*l.* Some of the cattle are in good store condition, others are almost ready for the butcher, but the greater proportion are lean, and are purchased to be fattened in the south. Cattle-dealing partakes a good deal of the excitement of gambling, as the profits may be largely increased by the state of the markets, the supply of fodder, and many unforeseen contingencies; and they are enhanced also by adroitness and aptness in making bargains. A man who spends his whole life in attending fairs is, therefore, a character *sui generis;* but he has none of the low trickery of the horse-dealer.

From the great Scotch trysts the cattle are sent off to the south in droves of from two to three hundred, under the charge of a person called a 'topsman.' The following account of the further progress of the animals is from the treatise on 'Cattle,' in the 'Library of Useful Knowledge:'—"The topsman generally goes before, to see that grass is secured at proper stations, and to make all necessary arrangements. He has under him other drovers, in the proportion of one to about thirty cattle. The journey to Norfolk occupies about three weeks. The expense in summer and autumn is from 1*l.* to 1*l.* 4*s.* per head; and in winter, when they are fed with hay, they cost 10*s.* or 15*s.* per head additional. The cattle are purchased and paid for by the drovers, sometimes in cash, but more generally a part of the price is paid in bills, and sometimes the whole of it. In some instances, where the farmer has confidence in the drover, he consents that the purchase-money shall be remitted from Norwich, or that the money shall be paid when the jobber returns home. The business is hazardous, and now and then unfortunate; but the drover considers himself well paid, if, every expense of the journey being discharged, he clears from 2*s.* 6*d.* to 5*s.* per head; and when he has either money or credit sufficient to take a drove of 600 or 1000 head of cattle to the market, that is a good remunerating price." The drovers are said to be a respectable and deserving class of men. They are very different from the class who drive the cattle into Smithfield market from the outskirts of London, where they meet another class, the country drovers; but neither the one nor the other are anything more than mere *drivers* of the cattle to market. The 'drover,' properly so called, requires either capital or credit.

ON THE BLASTING OF ROCKS.

The question whether or not the invention of gunpowder has increased or lessened the liability of the occurrence of war, is one which has been much contested; but it is at all events satisfactory to know that this formidable substance has been, and promises still further to be, a most powerful working agent in the hands of the civil engineer. The extensive operations now carrying on in the neighbourhood of Dover, where, by the agency of gunpowder, large masses of rock are being removed to prepare the way for the South-Eastern Railway, afford a remarkable exemplification of the process of blasting, which may deserve a brief explanation.

The blasting of rock by the aid of gunpowder is the substitution of a working agent which acts suddenly, for one which proceeds step by step. It is one grand effort, instead of a succession of efforts. It is a sudden disruption, whereby a mass of rock is detached, instead of being picked off piecemeal. The explosive or expansive force of gunpowder is the agent which effects this object; and much discussion has arisen respecting the precise mode in which this force is to be estimated. The explosion is considered as the extrication of a permanently elastic fluid by the ignition of the gunpowder, the elastic fluid or gas occupying nearly five hundred times as much space as the grains of gunpowder had done. Some scientific men have supposed that the nitre contains air between two and three hundred times denser than the free atmospheric air; and that this, in struggling for liberation, exerts a force equal to that of a thousand atmospheres: that is, that if the pressure of the atmosphere be taken at fifteen pounds in the square inch, the bursting force of ignited gunpowder is equal to nearly seven tons upon the square inch. Count Rumford even went so far as to estimate the bursting force as equal to ten thousand atmospheres, but this has been deemed extravagant. Be the amount what it may, however, the powerful mechanical force thus exerted is very evident, and could not long escape the notice of the civil engineer.

The purposes to which blasting by gunpowder would be likely to be applied in civil operations are, the detaching of the mineral riches in our mines and collieries, the excavation of tunnels, and the clearing away of cliffs and rocks for the formation of docks, harbours, quays, roads, railways, &c. In our mines immense quantities of gunpowder are annually used, for the purpose of blasting the coal and iron-stone, and thus saving the labour of the pickaxe. Brindley was the first to adopt the bold step of blasting a tunnel through a hill as a means of carrying a canal on a level, instead of making a detour round the hill, or ascending it by means of locks. In the year 1776 he completed the first navigable tunnel, at Harecastle in Staffordshire, which is upwards of a mile in length. Since that period many remarkable examples of tunnelling have been presented, in all of which, if the soil were hard and rocky, blasting by gunpowder has been the chief working agent. At Sopperton, on the canal joining the Thames with the Severn, there is a tunnel three miles in length, forced through the solid rock by means of gunpowder. In France, a tunnel

seven miles in length has been lately completed. In the famous Box Tunnel, on the Great Western Railway, the excavation through hard rock has been of almost unexampled magnitude, and has been executed with the aid of one hundred and thirty tons of gunpowder! In the structure of the Breakwater at Plymouth, the government purchased a hill or quarry of hard rock on the neighbouring shore, detached the rock in large masses by means of blasting, and constructed the breakwater with the masses thus procured. For the construction of the Royal Victualling Yard near Devonport, a recess or basin has been scooped out of solid rock by blasting, the rock furnishing a great part of the material for the structure, and the buildings occupying the place where the rock had before been. Between Folkstone and Dover, the South-Eastern Railway is to be carried along the very face of the cliffs, suspended as it were midway between land and sea; and to prepare the line of direction for this purpose, vast masses of jutting cliff are now being removed by blasting.

Such are a few instances to illustrate the kind of engineering operations in which blasting by gunpowder is available; and we may next briefly describe the mode in which the blasting is effected.

The object of blasting is generally not to shatter the rocky substance into a thousand pieces, but to detach it in a mass. In some cases, however, the utter disruption is desired. But whichever plan be adopted, the gunpowder is inserted in a hole bored in the rock itself, proportionate in size to the amount of effect to be produced. This hole is bored horizontally or obliquely, according to the depth of the strata of which the rock is composed, or to the position which the whole body of rock occupies. The hole may vary from half an inch to three or four inches in diameter, and from a few inches to seven or eight feet in length. The tools employed are few in number and simple in construction, and consist principally of augers and chisels of various diameters. The hole is produced chiefly by a kind of chisel called a 'jumper,' which (if the hole be small), is held in the left hand of the workman, and struck by a hammer or mallet held in the right, the jumper being moved about between the successive blows. If the hole is of large dimensions, one man guides the jumper, adjusting its position and moistening it with water, while another man strikes the blows with the hammer. Sometimes, instead of using a hammer, the men employ a very heavy jumper, much longer than the hole which they are about to bore; and, lifting this in and out of the hole, suffer it to perforate the rock by the weight and momentum of its descent.

When the hole has been bored to the proper depth, the *débris*, or broken rock, is scraped out, and the whole prepared for the reception of the powder. The hole being about half filled with powder, a long sharp instrument called a 'pricker' is thrust through it, as a means of forming a channel or recess for the reception of the 'priming.' Fragments of burnt clay, pounded brick, stone, and similar earthy matters, are then rammed into the hole on the top of the powder, the 'pricker' still remaining inserted in the centre. This ramming down of what may be termed the 'wadding' is the most dangerous part of the operation; for if there should be metallic particles enough present to produce a spark, an explosion would be very apt to follow. Many an eye and an arm has been lost by this cause.

When the powder has been firmly rammed in by the earthy matters laid on it, the 'pricker' is withdrawn, leaving a kind of tubular or conical space. The space is then filled with loose powder; or else a tube is made of wheaten or oaten straws, fitted end to end, filled with powder, and inserted in the cavity. By either of these means the powder is brought into connection with the external atmosphere, where it is placed in contact with a 'slow match,' consisting generally of a bit of soft paper, prepared by immersion in a solution of saltpetre. All is now ready. The workman applies fire to the paper, and immediately gives a signal for every one to run beyond the reach of danger, he doing so likewise. A minute or so elapses before the fire reaches the powder; but when it does, an explosion is heard, and the rock is rent asunder. If the charge of powder was too small, the rending is insufficient; if too large, the rock is not only dissevered, but is shattered into small fragments and scattered all around: the proper quantity of powder is therefore determined by experience.

Many improvements have been gradually introduced in the method of blasting; some of them highly curious in their nature. It used to be supposed that the blasting would not be effective unless the powder were rammed tightly down by strata of rock and earth above it; and hence numerous accidents which occurred to the workmen. But it is now found that dry loose sand, simply poured into the hole on the top of the gunpowder, will effect the end desired. A writer in the 'Encyclopædia Britannica' states that this method is now so much adopted, 'particularly at Lord Elgin's extensive mining operations at Charlestown in Scotland, where much attention is paid to the security and comfort of the artificer, as well as to everything interesting to science. The practice of using loose sand, instead of pounded stone rammed with force, has been in use several years,—it is believed, since about the year 1810." Sand was similarly used in the extensive quarrying operations which became necessary in cutting down a part of the Calton-hill, to form the new approach to the city of Edinburgh, where upwards of a hundred thousand cubic yards of rocky matter were removed, and one thousand pounds worth of gunpowder used in blasting.

But the most interesting circumstances connected with blasting are those which relate to the mode of ignition or kindling. Various contrivances, under the names of 'port-fire,' 'slow-match,' and 'fuzee,' have been applied to this purpose. The 'slow-match' is explained to be a piece of paper saturated with a liquid, which causes it to consume slowly or smoulder when ignited, instead of burning away at once. A 'port-fire' is a paper tube, filled with a composition of meal-powder, sulphur, and saltpetre, rammed moderately hard: it is a contrivance used to kindle the powder in a hollow cavity; but it is more adapted for the firing of guns and mortars than for blasting. A 'fuzee' or 'fuze' is a hollow tube of wood, filled with composition which has been rammed tightly down: it is inserted in a bomb-shell, which is not required to explode until a certain period after being shot from the mortar or piece; and therefore the composition is such as will burn slowly till it ignites the powder contained within the shell. Various modifications of these contrivances have been applied to the firing of gunpowder for blasting; but they bid fair to be superseded by one of a very remarkable and scientific character.

Among the effects which the passage of electricity produces, is one due to the existence of any obstruction to the free and unopposed transit. Those who are any way acquainted with the "galvanic battery" are aware the current therein excited will travel to any distance along a wire; and that if the wire be interrupted in its circuit at any part by a small interval, intense heat is excited, which may be made to ignite gunpowder or similar substances placed in the intervening space. It occurred to Colonel Pasley, to whom was consigned the office of raising the sunken 'Royal George' at Spit-

head, that a system of blasting analogous to that employed on land might be adopted to shatter the ill-fated ship: and that the powder, conveyed down into the water for this purpose, might be ignited by means of galvanic agency. The idea was a bold one, and the success has been signal. For months Colonel Pasley had to contend against great difficulties, in the construction of canisters or cylinders to contain the powder, in the means of preserving the powder from being wetted when the canisters were lowered into the sea, in the adjustment and fastening of the canisters to the sunken ship, in the connection of the wires of a voltaic battery with the gunpowder within the canisters, and in the firing of the charge without injury to those who had to superintend the operations at the surface of the water. These difficulties had to be overcome one by one; and the result has been the establishing of a system which seems likely to be extensively available both in land and sea operations. The galvanic batteries were on board a vessel on the surface of the water; and from the batteries wires descended through the water to the canisters (some of which contained three thousand pounds of gunpowder!), fastened to the exterior of the bottom of the ship. When the galvanic current was excited, it passed through the gunpowder contained in the canisters, ignited it, and caused an explosion which shattered the enormous hull of the sunken vessel to fragments. The statements which have appeared so abundantly in the newspapers, relating to the saving of guns, spars, fragments, &c. from the wreck, forms a sequel to these operations; for after the shattering of the wreck had been effected by the explosions, divers went down day after day for months together, fastened the dislodged guns and relics to chains depending from barges above, and gave signals whereby the articles were hauled up by the aid of capstans.

From that time, the use of the galvanic battery in igniting the gunpowder for blasting has attracted the attention of engineers. Very recently an explosion on an unexampled scale has taken place near the Shakspere Cliff at Dover; a million cubic yards of chalk-rock having been loosened and precipitated at one blast. Three pits or shafts were sunk, communicating with hollow chambers, in which eighteen thousand pounds of gunpowder were deposited. The wires of a galvanic battery were placed in connection with the powder, and the whole charge was fired at once. A great saving of expense will accrue to the company, by the sudden removal of a mass of rock which would otherwise have had to be removed by hand-labour, to form the line of railway.

Sheep in Mecklenburg.—The Saxon or Merino sheep, however, is the animal which best remunerates the Mecklenburger, and forms the especial object of his care and attention. They were brought to these countries from Saxony, about the year 1811, and are now universal. The greatest pains are taken to produce fleeces as nearly equal as possible over the whole flock. The nature of this sort of sheep is so little known in England, although an object of such vital importance to the British Australian Colonies, that I venture to hope a description of it may be acceptable. The Merino is a long-legged, narrow-bodied, ugly animal, with a fleece varying in weight, in proportion to its coarseness (although fine wool is specifically heavier than coarse) from 2 lbs. to 3 lbs. The staple is very close and thick growing, greasy or oily to the feel, elastic and soft, very tenacious, and formed differently from any other wools, with a number of regular, minute bends or curls, in each hair. There are always different sorts of wool upon the same sheep, and that animal is of course the most esteemed which produces the highest qualities in the greatest proportion. Breeding successfully with this view is a most difficult science, requiring years of pains-taking intelligence to attain. I was present at the exhibition of 82 rams at the cattle-show of Güstrow in Mecklenburg, in May, 1837. The specimens to an inexperienced eye appeared much alike; they were carefully washed and shorn, the fleeces numbered and sent to the most eminent wool-staplers at Leipsic, where they were submitted to accurate assortment and valuation. The Merino is supposed to be indigenous to Spain, and known to have been first introduced into Germany in 1765, by the then Elector of Saxony. Shortly after (about 1775), another small flock was brought to Austria, and subsequently in 1786, and 1802, to the imperial domains of Holditch in Hungary, and Mannersdorf in Austria. From these small beginnings has this valuable animal been spread over these immense countries. But there are two distinct breeds, which differ materially in shape and the quality of their wool. 1st.—The Infantado, or Negretti, distinguishable by shorter legs and a stouter make; the head and neck generally short and broad, the nose short and turned up, and the body round like a barrel. The wool is often matted upon the neck, back, and thighs, and grows upon the head to the eyes, and upon the legs to the very feet. The grease in its fleece is almost pitchy, and as the dust becomes incorporated with it, the washing is a matter of difficulty and risk: the greatest care is at all times necessary in this operation. A warm mild day, without harsh or drying wind, is indispensable, and care must be taken never to rub the fleece with the hand. A marl-pit with a depth of from eight to ten feet of clear water is a favourite washing-place, and is thought to become better every year. The sheep are thrown in from a stage in the evening, and made to swim the whole length of the pond (twenty to thirty yards), between rails, with boards on one side, from which women or boys assist them through their bath, by placing wooden rakes or crooks under their chins, and so passing them onwards. When the water has dripped from the fleeces for an hour or two, the sheep are put into a house for the night, as close together as possible, in order to cause the greater evaporation; and the next day they are swum three or four times through the same pond, the last time the head being rubbed a little, and they are kept in the house (well supplied with clean straw), on dry food, for three or four days, until the wool, by sweating, as it is termed, has recovered its characteristic softness. The fleece of this species is generally thick, closely grown, and abundant. Ewes may average two and a quarter and even three and a quarter pounds by careful feeding (which, however, must never approach to feeding to be fat, else the wool becomes wiry and hard); and rams and welders may bring four pounds, and even six pounds. This is the animal which came to Austria from Spain. The other distinct breed is the Saxon importation, and is called Escurial. Their shape differs markedly from the Infantados—longer legged, with a long spare neck and head, with very little wool on the latter: a finer, shorter, and softer character in its fleece, but deficient in quantity. One and a half to two pounds is frequently the amount from ewes, and two to three pounds from rams and wedders. On being presented to the Elector of Saxony in 1765, they received the appellation of Electorals. A great deal of trouble has been taken to combine the advantages of both breeds by crossing, but with doubtful advantages; and although the mixed breed has been found suitable for crossing with sheep not thorough-bred (called Mestizen), yet experience has shown that, to breed with advantage, all the rams, be the ewes what they may, should be either thorough-bred Infantados or Escurials, and that the same strain of blood should be persevered in. I know an instance where a large and valuable flock has been for years retrograding in consequence of *one* unsuitable ram having been introduced twelve or fourteen years ago. Good rams are of course becoming every year more attainable, but there are examples of breeders in Saxony who still obtain for distinguished rams as much as one hundred, two hundred, and even three hundred Louisd'ors (of nineteen shillings each).—*Communications of Mr. Carr to the Agricultural Journal.*

Conversation.—Whosoever hath his mind fraught with many thoughts, his wits and understanding do clarify and break up, in the communicating and discoursing with another; he tosseth his thoughts more easily; he marshalleth them more orderly; he seeth how they look when they are turned into words: finally, he waxeth wiser than himself; and that more by an hour's discourse than by a day's meditation. It was well said by Themistocles to the king of Persia, "That speech was like cloth of Arras, opened and put abroad; whereby the imagery doth appear in figure; whereas in thoughts they lie but as in packs."—*Lord Bacon's Essays.*



[Yew-tree, at Fountains Abbey, Ripon, Yorkshire.]

THE YEW.

Some of the finest and most venerable yews are found in churchyards, and in many instances are coeval with the edifice around which they cast their solemn shade. Generations after generations have been borne to their last resting-place, and the brief memorials of their life have perished by the hand of time and forgetfulness, while the yew flourishes for hundreds of years afterwards. Like all the productions of nature destined for a protracted existence, its growth is slow; a century elapses before it reaches maturity. There is reason to believe that the fine old tree represented in the cut was planted before the Saxon period of our history was brought to a close by the Norman conquest. Fountains Abbey, where it still flourishes, was founded in 1132 by Thurston, Archbishop of York, for certain monks who separated themselves from the Benedictine Abbey of St. Mary's, York, in order to adopt the more austere discipline of St. Bernard. Burton, in his 'Monasticon,' gives the history of Fountains Abbey on the authority of a monk of Kirkstall, and we may briefly follow him, as it will be seen that our tree has some connection with his tradition:—"At Christmas, the Archbishop, being at Ripon, assigned to the monks some land in the patrimony of St. Peter, about three miles west of that place, for the erecting of a monastery. This spot of ground had never been inhabited, unless by wild beasts. The prior of St. Mary's, at York, was chosen abbot by the monks, being the first of this monastery of Fountains, with whom they withdrew into this uncouth desert, without any house to shelter them in that winter season, or provisions to subsist on, but entirely depending on Divine Providence. There stood a large elm-tree in the midst of the vale, on the lower branches of which they put some thatch and straw; and under that they lay, ate, and prayed, the bishop for a time supplying them with bread, and the rivulet with drink. Part of the day some spent in making wattles to erect a little oratory, whilst others cleared some ground to make a little garden. But it is supposed that they soon changed the shelter of their elm for that of seven yew-trees, growing on the declivity of the hill on the south side of the abbey, all standing at the present time (1685) except the largest, which was blown down about the middle of the last century. They stand so near each other as to form a cover almost equal to a thatched roof. Under these trees, we are told by tradition, the monks resided till they had built the monastery." What singular vicissitudes have taken place even under their shade! The abbey itself is now a ruin—perhaps the finest of the kind in England. Three centuries have passed away since its choirs and belfries were silenced; and yet a duration of four centuries from the building of the abbey to its dissolution is not a brief space, even in the history of a nation.

Of the yews at Fountains Abbey, the Seven Sisters as they were called, five still flourish, and may do so perhaps for many centuries to come; for even when the original trunk decays, the final ruin of the tree is not accomplished. This peculiarity of the yew is explained as follows by Mr. Loudon, in his 'Arboretum:' —"When the top of the trunk becomes cracked by the action of storms upon the boughs, the rain finds access, and in time causes decay; and the dead leaves and dung of bats and birds, &c. falling in, combine with the rotten wood to form a soft rich mould, into which a bud shooting out from a neighbouring part (if not actually covered with the mould) is naturally

drawn by the moisture and surrounding shade, and transformed into a root. As the fissure widened and deepened by the slow but sure progress of decay, this root would descend and thicken, till it ultimately fixed itself in the soil below. After a lapse of perhaps several centuries, decay, gradually advancing, would at last reach the circumference of the trunk, and produce a rift on one side; through this the rotten mould would fall out, gradually exposing the root it had conducted downwards, and the combined influence of light and air acting upon its juices would cause it to deposit annual layers of true wood, and to be covered with a true bark. Meanwhile it would have shot up a stem near its point of union, and have formed for itself an independent head and branches." In cases where this process takes place, the existence of a yew-tree on a particular spot might continue as long as the world endures.

The origin of the custom of planting yew-trees in churchyards is still a subject of considerable perplexity. As the yew was of such great importance in war and field-sports before the use of gunpowder was known, perhaps the parsons of parishes were required to see that the churchyard was capable of supplying bows to the males of each parish of proper age; but in this case we should scarcely have been left without some evidence on the matter. Others again state that the trees in question were intended solely to furnish branches for use on Palm Sunday, while many suppose that the yew was naturally selected for planting around churches on account of its emblematic character, as expressive of the solemnity of death, while from its perennial verdure and long duration it might be regarded as a type of immortality. Another origin has also been ascribed to the custom. In the works of a very ancient Welsh bard, two churches, the minster of Esgor and that of Hênllan, are spoken of as famous for the prodigious yew-trees which surrounded them. Hênllan signifies an old grove, and it has therefore been inferred that the church occupied the very site where the Druids had performed their rites before the introduction of Christianity into Britain. St. Augustine was enjoined by Gregory the Great not to destroy the pagan places of worship which he might find in this island, but to convert them into Christian churches; and if, as it has been suggested, the words kirk and church are derived from *cerrig*, a stone or circle of stones, it may possibly be correct to conclude that in some cases the first Christian churches in Britain were planted in the groves sacred to Druidical rites, and within the circular stone enclosures where the priests of this worship officiated. Dr. Stukely was of opinion that the round churches were the most ancient in England. From custom and taste, the planting of yew-trees in churchyards might easily be perpetuated from the pagan period, as we see in the present day, when the tree has ceased to be applicable to the objects for which it was once so much valued.

The use of the yew for making bows is noticed by the earliest Greek and Roman writers. Archery was the 'arm' for which England was most famous before the invention of gunpowder. Several of our old statutes forbid the exportation of yew, and its importation was enforced by several regulations, such as obliging foreigners to furnish ten bow-staves for every butt of wine which they brought to England. Other kinds of wood were also used for bows. Roger Ascham, who published his 'Toxophilus' in 1544, with a view to preserve or revive the manly old English weapon, says:—"As for brasell, elm, wych, and ashe, experience doth prove them to be mean for bowes; and so to conclude, ewe, of all other things, is that whereof perfite shootinge would have a bowe made." A preference seems to have been given to foreign yew when Ascham wrote. Mr. Loudon was informed, in 1837, by the principal bow-manufacturer in England, that the "common yew, with sufficiently clear and knobless trunks, is no longer to be found either in England or in any other part of Europe; and though," he said, "English yew is occasionally used by manufacturers, yet bows are now almost entirely made of different kinds of wood from South America." Ascham states that the best bows were made of the bole of the yew. "The bough," he says, "is knotty and full of pruines; the plant is quick enough of caste," but it was apt to break. Is not then the poet in error when he describes an ancient yew still existing as having perhaps furnished weapons to

> "Those that crossed the sea,
> And drew their sounding bows at Agincourt;
> Perhaps at earlier Cressy or Poictiers."

No European tree is so excellent for the cabinet-maker as the yew. It unites hardness with a close grain; is of a fine orange-red or deep brown colour, often beautifully veined, and is capable of receiving a high polish. The sap-wood, which forms only a small portion, is quite white, and also very hard. The yew is also admirable for many other purposes, for which it would be used if it were less scarce. Gilpin states that it was a saying in the New Forest, that a post of yew would outlast iron. When the yew-trees on Box Hill, Surrey, were cut down, about half a century ago, the half of one tree was sold for 50*l*., to be used in cabinet-work for inlaying. The yew makes an excellent and well-sheltered fence. For ornamental purposes, the trees selected should be females, as the berries which they bear add greatly to their beauty. They may be eaten with perfect safety; but the shoots and leaves are poisonous in many cases to some animals, whether in a green or dry state, while others eat them with impunity. When the Dutch style of gardening prevailed in this country, the yew was in great esteem, as it was more pliable under the shears than either box or juniper.

The dimensions of the tree in the cut are as follows:—height, fifty feet; girth at three feet from the ground, twenty-two feet eight inches; at five feet, twenty-six feet five inches. It is the largest of the now remaining five, and forms the end of the row. In the list of recorded trees of this species given in Mr. Loudon's 'Arboretum,' we find one mentioned still larger. It stands in Darley Dale churchyard, Derbyshire, and though the height is not greater, yet at the base the girth is twenty-seven feet; at two feet from the ground, twenty-seven feet seven inches; at four feet there are protuberances which swell the girth to thirty-one feet eight inches. The trunk is forked at seven feet from the base. The tallest yew-tree in England is in the churchyard of Arlington, near Hounslow, which is fifty-eight feet high. A famous yew at Ankerwyke, near Staines, is thirty-two feet five inches in girth at eight feet from the ground, and the diameter of its head is sixty-nine feet. At Tisbury, Dorsetshire, there is a yew whose circumference is thirty-seven feet: it is perfectly hollow, and a few years ago a party of seventeen persons breakfasted within its capacious bole. In many churchyards in Scotland and Wales, as well as in England, there are yew-trees of great antiquity. At Queenwood, near Tytherly, Wilts, there are some fine avenues of this tree. One avenue consists of one hundred and sixty-two trees, averaging a height of thirty feet, planted about two hundred years since. The other comprises one hundred and twenty trees, average height twenty-four feet, and it is believed they were planted about one hundred and seventy years ago. The usual growth of a seedling is six or eight feet in ten years, and about fifteen feet in twenty years.

PLANTS USED IN DYEING BROWN AND BLACK.

The materials used in dyeing, for the most part, derive their chief value in reference to their powers of producing the various shades and qualities of red, blue, and yellow; since the combination of different proportions of these three will produce an almost interminable series of other colours. There are, it is true, some ingredients employed which give a green dye, but for the most part the varied tints of green—whether known as sea-green, apple-green, grass-green, pea-green, or parrot-green—are produced by a double dyeing, first with blue and then with yellow, or first with yellow and then with blue. There are, however, substances specially employed in giving a black or a brown dye; and as we have in former numbers noticed the chief vegetable substances used in dyeing red, blue, and yellow, we will here mention a few calculated to give black or brown tints.

One of the most valuable substances employed to impart a black dye is *galls*, a remarkable tumour or excrescence growing on various trees. Sir J. E. Smith designates them as "morbid excrescences, originating from the most vigorously-growing parts of plants, in consequence of the attacks of insects, chiefly of the *hymenopterous* order, and of the genus *cynips*." The same authority describes the mode of formation, without reference to any particular kind of tree or gall, somewhat as follows:—The parent insect is provided with a sharp sting, serving to perforate the branch, leaf, or bud in which its egg is to be deposited; and in some cases the puncture made is very deep. As soon as the egg is hatched, the young larva, or maggot, stimulating the vital principle of the plant, causes the part in which it is lodged to assume a great degree of luxuriance, displayed in various extraordinary excrescences, foreign to the nature of the plant in itself, but each appropriated to the particular kind of insect from whose operations it springs. The original perforation is soon closed up and entirely obliterated. At length, the maggot having fed on the juices of the plant, copiously directed to the injured part, undergoes its changes to a chrysalis, and finally to a winged fly like its parent: it then escapes from its confinement by a fresh perforation, and the gall, being left empty, soon dries or hardens.

Such are briefly the steps in the formation of a "gall-nut." The oak is the tree which yields the main supply of galls. The light spongy bodies, growing on one of the English species of oak, and vulgarly termed "oak-apples," are galls; they grow from the stalks of the leaf or flower, or from the young twigs; and there is sometimes a red juicy berry-like excrescence, something like a cranberry, found on the leaves. The two kinds used principally in dyeing and ink-making are called the "common" and the "Aleppo" gall, the former being brought from the South of Europe, and the latter from Western Asia. The Aleppo gall-nut is a round body, of an olive-green colour: it is hard and heavy, and frequently exhibits small protuberances on its surface. When broken it is found to consist of four distinct parts, which admit of being separated. The external or cortical covering is of a close fibrous but thin texture, highly astringent to the taste. The part that immediately follows is very similar to resin, both in its fracture and lustre; its colour is dark yellowish-brown; it is very brittle, and its taste nauseously astringent and bitter; on a red-hot iron it becomes black, exhales a peculiar odour in great abundance, consumes without flame like the cortical covering, and leaves a little ash. It is bounded on the interior by a pale yellowish-brown shell, which has many of the properties of ligneous fibre. Lastly, this shell encloses, when the gall-nut is sound, an oval kernel, about a quarter of an inch in length, of a brownish cream colour, or sometimes of a bright chocolate: it is insipid unless chewed; but if chewed, a faint sweetish flavour is appreciated, like that of a bad almond.

The common gall-nut differs considerably from the preceding, and is easily distinguished. It is of a yellowish colour, not so heavy as the Aleppo gall, nor possessed of the same resinous fracture; it is also larger, being about the size of a nutmeg; less astringent, and not capable of making equally good infusions with water; on which latter account it is much less valued.

From very early times the gall-nuts of Syria have been esteemed for their excellence as a dye ingredient. They are shipped principally from Aleppo, Smyrna, and Tripoli; and hence in some respects have arisen their commercial names: but they are brought from the interior country. The finest quality of all are those obtained near Mosul, about ten days' journey from Aleppo, and thence conveyed to Aleppo for shipment to Europe. Other kinds nearly as good are found near the shores of the Tigris and Euphrates, still farther eastward. The inhabitants of Kurdistan have this trade chiefly in their own hands: they bring the gall-nuts from the interior country to the Levant ports during the winter months. The bluest specimens are the highest in price, and next to them those of a greenish colour; the whitest sort is the cheapest, a circumstance which has often led crafty dealers to dye white galls to give them greater apparent value.

Beckmann states, that in the oak-forests of Hungary, Moravia, Croatia, and Sclavonia the farmers and foresters used to notice excrescences growing on the trees; the men subsisted principally by the breeding of hogs in the forests; and they were wont to consider the frequent occurrence of these excrescences as a calamity, since, when they appeared in abundance, the crop of acorns, the food of the hogs, was observed to be considerably diminished. But they afterwards found that these excrescences, which they called "knoppern" or "knobben" (equivalent to the common English term "knobs"), were known and valued as a means of producing a black dye; and that the profits arising from the sale of this new article of trade far surpassed that derived from the acorns. In the year 1774 the inhabitants of these provinces obtained permission to export this article by sea to the Austrian harbours in the Mediterranean; and it thenceforth became an article of commerce.

As a substitute for gall-nuts the ancients frequently made use of acorn-cups; and indeed the latter are still used in Italy, from whence, in latter times, they have found their way into Germany and France. They are imported from the Greek islands and Smyrna. It is recorded that in 1779, when the supply of "knoppern" in the Austrian dominions temporarily failed, a merchant of Vienna caused upwards of twelve hundred-weight of acorn-cups to be sent from Smyrna, which he sold with great advantage. These cups, and the acorns they contain, are very large; the former are about two inches in diameter, are woolly within, and furnished with woody scales on the external surface; the latter are about two inches long, and almost entirely enclosed by the cup, so that the top only is visible.

Gall-nuts, and the acorn-cups just alluded to, when pounded, yield an infusion which becomes the foundation of one of the most valuable black dyes, whether silk, woollen, cotton, or linen be the fabric under operation.

Another class of vegetable products useful in imparting black dye is the *bark* of several kinds of trees.

The bark of some trees, such as the *quercus* (oak), the *berberis* (barberry), and the *fraxinus* (ash), contain restringent or colouring particles useful in dyeing. The oak is a tree whose bark yields a very valuable infusion, both for dyeing and tanning. A description of the country-occupation of oak-bark peeling was given in one of our early volumes.

A variety of vegetable substances yield small quantities of black dye ingredient, useful in some of the modifications of dyeing, but not in the larger and more extensive processes. A black colour is obtained from the juice of the *cashew-nut*, which will not wash out, and even resists the process of boiling with soap or alkalies. The juice of a variety of the cashew found in the East Indies yields a dye having a brownish tinge. The juice of the common aloe might be made to yield a bluish-black dye, but the quantity of this plant available is too small to make its use important. Logwood, although most extensively employed in imparting a black dye to cloth, cannot so consistently be deemed a black as a red dye; for it gives the latter colour as a preparative for the action of other ingredients which give the black tinge; its principal effect is to give a lustre and beauty to black colours, which would otherwise appear what is often termed "rusty." The leaves of the *arbutus uva ursi* have been sometimes employed as a substitute for galls, in giving a pretty good black colour to cloth which has previously been dyed blue. Gall-nuts, however, used in conjunction with an oxide of iron, constitute the main and important agent in black dyeing.

Brown colours are in many cases imparted by a mixed application of black and red, different proportions of which will give a varied series of browns. But there is a class of colours called *fawns*, which constitute a brown not capable of being given by mixed black and red; such colours are largely used in dyeing, and they are generally produced by the action of some one substance, according to the tint. *Walnut-peels* form one of the most useful of these agents. These peels constitute the green covering of the nut; they are internally of a white colour, which is converted into brown or black by exposure to the air. The skin, when impregnated with the juice of walnut-peels, becomes of a brown or almost black colour, as any one may have noticed who has seen the peelers at work. If the decoction of walnut-peels be filtered and exposed to the air, its colour becomes of a deep brown; the pellicles in evaporation are almost black, and the liquor detached from these yields a brown extract, completely soluble in water. A copious precipitate, of a fawn colour, approaching to ash, is produced in a decoction of walnut-peels by means of a solution of tin, and the remaining liquor has a slightly yellow tinge.

The affinity of cloth for the colouring-matter of walnut-peels is said to be very strong, so that the dye is taken readily and is durable. In the latest edition of Berthollet's work on dyeing it is said—"When it is wished to dye with walnut-peels, they are boiled for a full quarter of an hour in a copper in quantity proportionate to the amount of stuff, and to the depth of shade that is desired. For cloths, the deepest shades are usually begun with, finishing with the lighter ones; but for woollen yarn it is commonly the clearest shades that we begin with, and the deepest shades are made at the end, with the addition of husks for each parcel.

"The root of walnut gives the same shades, but for this effect the quantity must be increased: it must be reduced to chips."

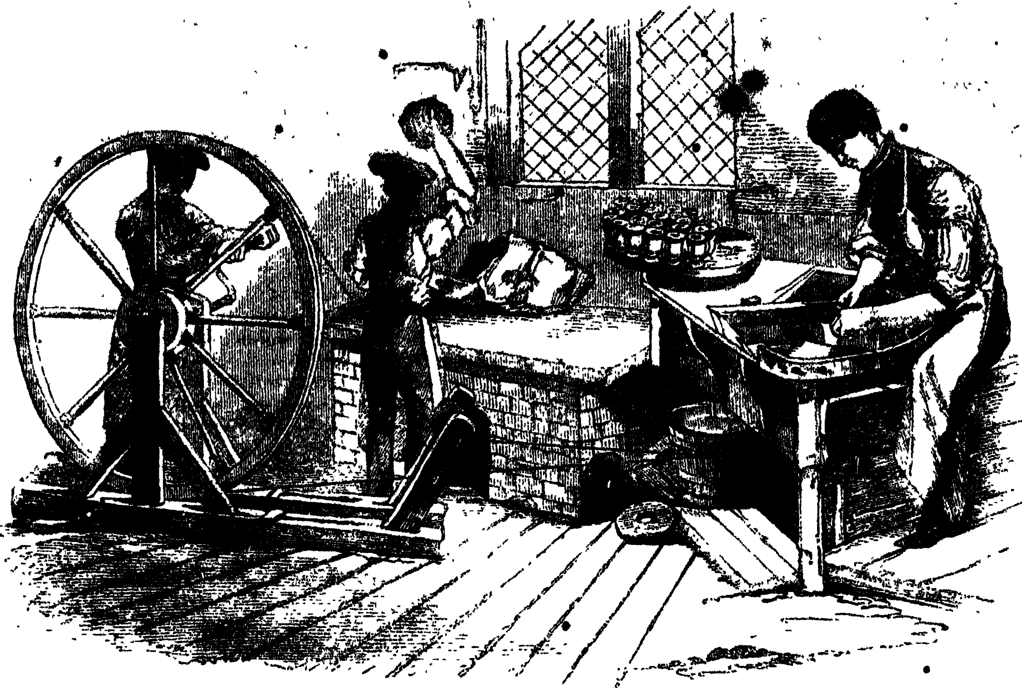
Sumach, the bark of the birch-tree, sandal-wood, and many other vegetable substances, are employed occasionally to give various tints of fawn, drab, or brown, according to the circumstances under which the operation is conducted, the material of the woven fabric, and the quality of the dye ingredient. But many of these have been already spoken of while treating of plants used in dyeing yellow; and the rest call for no particular remark.

Decadence of a State.—The temples of antiquity, the castles of the middle ages, are poetical in their decline, for the spirits that peopled them in the days of their splendour still wander through the cherished ruins; but what spirit would condescend to haunt the ruins of a rope-walk? Trade has no spirit, and sets none in movement: it knows of nothing but positive speculations, and sets nothing in movement but legs and arms; but let the wheel stop, and poverty, wretchedness, beggary, are the immediate consequences. Alas, to be poor is no greater hardship than to be rich, for our wants increase with our power of gratifying them; but to *become* poor, that is bitter, for it carries with it an involuntary feeling of a fall! How much more, then, when it is a nation that has become poor. Spain is not poor, they will tell me, for it possesses inexhaustible resources within its own soil; but of what worth are these resources to people who know not how to bring them into play? At the time of the Moors, Spain contained twenty millions of inhabitants;—some say thirty;—now it does not contain ten. The land was then rich and flourishing, and sufficed for all the wants of a luxurious population. Of course it must then have possessed resources, that became dormant in proportion as the population melted together. The land remains uncultivated because roads and canals are wanting for the conveyance of its produce. The plains of Castile grow the finest wheat in the world; and when grown it is given to the pigs, because the grower has no means of conveying it to a market. There is no trade but along the coast, and even there it is almost exclusively in the hands of smugglers. The land that once monopolized the trade of both the Indies, the land that could fit out the Invincible Armada for the conquest of England, possesses at present not a single man-of-war, and has no commerce but what is carried on by smugglers!—*Letters of the Countess Hahn-Hahn; from the Foreign Quarterly Review.*

Villages of the Warows, in British Guiana.—The *Mauritia* grow in clusters as thick as trees can grow; the Warow selects one of these groves, and fells the trees about four feet from the surface, on their stumps he lays a floor of the split trunks; the troolies are generally adjacent for the roof, but if not, the eta leaf serves; lumps of clay are laid on the floor, on which fires are made, which at night illuminate the tops of the adjacent trees, as if they were actually inhabited; but the habitation is an irregular hut, raised on a platform just above the level of the water, which in these regions is three feet above the earth for three-fourths of the year. Some of them can contain 150 people. Their duration is allied with the supply of aroo (starch or arrow-root), or eta starch, to the completion of the formation of a corial or canoe. When an eta tree begins to fructify, it is cut down, a large slice is cut off one side, and the stringy substance of the interior is cut into shreds, the remainder of the trunk serving as a trough, in which it is triturated with water, by which is disengaged a considerable quantity of starch; the fibrous particles are then extracted, and the sediment, or aroo, formed into moulds like bricks. This is spread out, on stones or iron plates, over the fire, and makes a very nutritive, but at the same time most immasticable bread—it must be unavoidably bolted, being so very viscous that chewing absolutely locks the jaw: it is, nevertheless, excellent to thicken soup, and is a general specific for diarrhoeas and dysenteries, which in these aquatic regions are the prevailing diseases. In the green part of the trunk, a beetle of about an inch and a half long, with a long snout, which lays its eggs, and in about a fortnight grubs, about the size of the two first joints of the forefinger, make their appearance. These are a favourite fry both of the Warows and the creoles; they are scarcely distinguishable from beef marrow.—*Hillhouse's Memoir, in Geographical Journal*, vol. iv.

The difference between desultory reading and a course of study may be aptly illustrated by comparing the former to a number of mirrors set in a straight line, so that every one of them reflects a different object, and the latter to the same mirrors so skilfully arranged as to perpetuate one set of objects in an endless series of reflections.—*Guesses at Truth.*

A DAY AT THE ROYAL PORCELAIN-WORKS, WORCESTER.



[Potter's Wheel—'Thrower, 'Ball-maker,' and Wheel-turner,' at work.]

THOSE among our readers who may have witnessed the remarkable "Chinese Exhibition" near Hyde Park (and well would it be if the price of admission permitted all classes to visit this singular memento of a singular nation), cannot fail to have observed the sumptuous specimens of *porcelain* there deposited—the vases, jars, cups, and other vessels; and may then have conjectured whether or not England can produce specimens equal to these. China has, by a sort of prescriptive right, been deemed the land of porcelain, the country whose inhabitants occupy the first rank in the production of this most delicate, chaste, and elegant semi-transparent material. Thanks to the inquiries and ingenuity of travellers, manufacturers, and men of science—who have discovered the nature of the principal substances employed by the Chinese, the localities in which they may be found in Europe, and who have employed the services of painters far more skilful than any to be found in China—our country now produces specimens of porcelain possessing all those claims to admiration which the "Celestial Empire" has put forth for its manufacture, and—in respect to pictorial embellishment—others in which our Asiatic friends cannot for a moment share.

The "good city of Worcester" is one of the spots in England where the manufacture of the higher kinds of porcelain is located. Those topographers and local historians who love to trace the steps of royalty, have recorded the visits of King George and Queen Charlotte to the "Royal Porcelain-works" at Worcester, as one of the most marked features in the district; and indeed the high fame which Worcester porcelain has acquired gives the town reason to be somewhat proud in the possession of such a manufacture. For a long period two eminent firms among others, viz., Messrs. Flight, Barr, and Barr, and Messrs. Chamberlain, carried on this branch of manufacture independent of each other: but these two firms have now merged into one, which combines the resources of both; and the "Royal Porcelain-works" of Messrs. Chamberlain and Co.—an extended firm—are now the representative of both. To the courtesy of these gentlemen, then, our thanks are due for permission to view and describe the processes conducted in this highly interesting establishment.

Everybody knows that porcelain is the same material as that which is commonly termed 'China' (a name which in itself does homage to the original producers of the substance), but the meaning of the name is not so well known. One authority* says —"The Portuguese traders were the means of introducing the fine earthenwares of China into more general use in Europe; and the name assigned to the fabric, as distinguishing it from the coarser descriptions of pottery of domestic manufacture, was most probably given by them—*porcellana* signifying, in the Portuguese language, a cup;" while another authority† states—"It has been satisfactorily shown by Marsden, that the word porcelain, or *porcellana*, was applied by Europeans to the ware of China, from the resemblance of its fine polished surface to that of the univalve shell so named; while the shell itself derived its appellation from the curved or gibbous shape of its upper surface, which was thought to resemble the raised back of a *porcella*, or little hog." Leaving the reader to select between the 'cup,' and the 'little hog,'

* 'Lardner's Cyclopædia.'

† Davis: 'The Chinese,' chap. 17.

as the forerunner of the name, we will quit this matter by stating that the manufacture to which our attention will be directed is strictly that of porcelain in its most highly finished form, and does not include the commoner kinds of produce classed under the general name of *pottery*.

The factory is situated near the cathedral of Worcester, and not far from the Severn, which flows through the city; and from the upper windows a glance across the Severn shows the blue outline of the Malvern Hills in the distance. In this as in many other large factories there is a central court or area, surrounded by buildings of various forms and dimensions, suited for the processes of manufacture. The general arrangement of these may be indicated by following the processes in their natural order.

First, there is the building in which the crude materials are brought into a plastic or working state. Here we see a ponderous circular stone, nearly four tons in weight, working round in a circle on its edge, and crushing beneath it the stony ingredients of the porcelain. Then, in another part of the building, is a circular vessel, provided with a stirring apparatus, for further preparing the substances by the aid of water. The mixing-room, in another place, contains the vessels in which the pounded ingredients are worked up into a smooth kind of clay, fitted for the purposes of the workman.

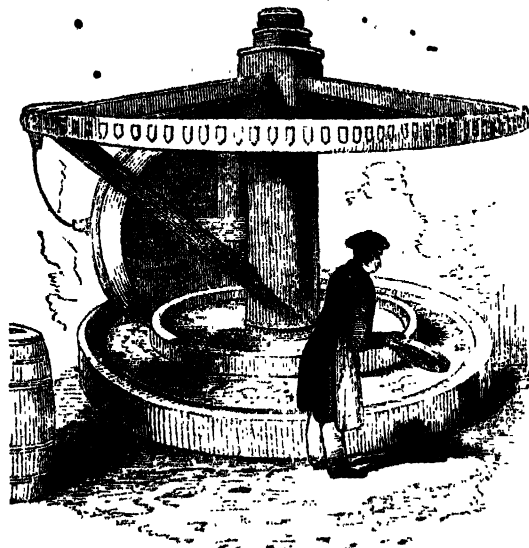
Following the prepared material to the hands of the workman, we visit the 'throwing-room,' where the remarkable process of forming circular vessels is conducted. This is a long and busily occupied shop, containing a great number of men employed as we shall describe presently. Kilns in great number are disposed conveniently, with respect not only to the 'throwing-room,' but to the other workshops: for there are 'biscuit-kilns,' 'glaze-kilns,' and 'enamel-kilns,' according to the state of the process in which heat has to be applied to the ware.

Various rooms, called 'placing-room,' 'dipping-room,' 'white-ware room,' 'modelling-room,' 'moulding-room,' 'pressing-room,' &c., are disposed round the open area, for the prosecution of various processes in the course of the manufacture; to which succeed others known as the 'painting' and 'burnishing' rooms, in which those elaborate decorations are given to the manufactured article which form one of the most marked features of distinction between it and common pottery-ware. Then we come to the warehouses in which the finished product is stored. Lastly, there are shops, drying-rooms, and kilns, for the manufacture of the 'tessellated tiles,' which are now becoming so extensively used.

We have glanced at the buildings, and now let us glance at the workmen, and the remarkable processes by which the costly specimens of porcelain are produced. The rough ingredients, too, must have a passing notice.

The ingredients to form porcelain may to many persons seem rather strange. They consist of common flint, flint in the calcined state, Cornish stone, Cornish clay, and calcined bone, all ground and mixed together with water, so as to form a beautifully fine and plastic clay. Numerous and intricate have been the researches into the respective value of different kinds of material, and the particular quality which each one gives to the porcelain. The clay employed, as its name imports, is brought from Cornwall, and is found to possess qualities wanting in most other kinds of English clay. For the commoner kinds of pottery, clay brought from Dorsetshire and Devonshire is largely employed; but for the more exquisite specimens of porcelain this Cornish clay is preferred. Until about a century ago, the strangest views were entertained in Europe respecting the composition and nature of Chinese porcelain; and it was not till after many researches that Reaumur found that the mixture of the two peculiar kinds of earth found in China, called *pe-tun-tse* and *kao-lin*, produced porcelain. It then became an object to discover whether any earths similar to these existed in Europe; and at length Mr. Cookworthy, about seventy years ago, discovered in Cornwall two kinds of earth which nearly answered the desired character. From that time to the present various improvements and additions have been made in the ingredients employed, with a view to produce a porcelain possessing hardness, strength, firmness of texture, whiteness of colour, and a capacity of receiving and retaining colours and gilding on its surface. The Cornish clay is by far the most costly clay employed in such works; but for the finer porcelain it is deemed indispensable. We may perhaps say, in accounting for the respective value of the ingredients, that the clay gives the plastic or working quality, the flint imparts the vitreous or strengthening quality, and the bone aids in producing the semi-transparency for which porcelain is so deservedly admired.

The ingredients have different degrees of hardness, but all must be reduced to an impalpable powder before being mixed. They are laid on a circular bed, as represented in the cut, and ground by the pressure



[Grinding the Flint, Clay, &c.]

of the bulky and ponderous stone roller. They are then transferred to a large circular vessel containing water, and by means of stirrers, sieves, and other appliances, brought into the condition of a creamy liquid, totally free from any gritty particles. It is astonishing to see the degree of fineness thus produced, as manifested by the extreme minuteness of the meshes or interstices of the sieve through which everything must pass before being deemed fitted for the manufacture.

Various depositories or receptacles are provided, in which the ingredients are placed separately during the course of their preparation; and from these they are conveyed to the 'mixing-room,' where they are combined together. Here the experience and judgment of the manufacturer are brought into operation: he has to determine not only the number and kind of ingredients which will produce a ware fitted for service, but also the proportions in which these ingredients are to be combined. It is not improbable

that each eminent firm has a recipe peculiar to itself, as is known often to be the case in the glass manufacture, and many other manufactures in which several ingredients are employed. Without making any guess then, as to the proportions used in the establishment to which our details relate, we may proceed to state that the ingredients are mixed together in large square vessels, the utmost attention being paid to the intimate union of all the different kinds. The mixture presents the appearance of a kind of drab-coloured liquid, which is then evaporated to a certain degree of thickness or stiffness by heat applied beneath it. In short it is by the agency of heat that the cream-like liquid becomes a plastic workable clay, fitted for the hands of the potter. Constant attention is necessary throughout this process, to equalize the rate of evaporation and to retain the ingredients in perfect combination while it is going on.

To the 'throwing-room' and the 'potter's wheel' we now direct our attention, where a process is conducted which has never failed to excite the astonishment of a spectator who witnesses it for the first time; nay, there are many who find the comprehension of the process almost as difficult after many visits as after the first. Never does any one agent appear a more complete master over another than the potter is of his clay: he seems as if he could do anything, everything, with it. At one moment his mass of clay is a shapeless heap; at another a circular cake; then a ball; then a pillar or cylinder, hollow or solid; then a jug; then a basin; a sudden turn converts it into a bottle, or a plate, or a saucer. His hands work and form the plastic material with a rapidity almost inconceivable; and we often doubt where the clay seems to come from, and whither it goes, when one form is being exchanged for another. It is true that, in practice, the potter does not give all these several forms to one individual mass of clay; but a visitor has frequently an opportunity to see that the man *can* do so. What a pity, some may say, that such an elegant process (for such it assuredly is) should be thrown away upon wet dirty clay; but in truth the peculiar state of the clay is the very circumstance which gives to the potter such a command over it. But let us look at the arrangements of the potter's shop before we describe his operations.

Why such a room should be called a 'throwing-room,' or why the formation of circular vessels should be called 'throwing,' it does not seem very easy to determine. There is a circular motion in pottery-throwing and also in silk-throwing: but why the same term should be applied in both cases, or why applied at all, we do not see. We believe, however, that 'throw' is a provincial name for a lathe; and if so, an explanation is easily provided, by considering the potter's wheel as a lathe or throw. The throwing-room, however, be its appellation good or bad, is an oblong room, containing a great number of benches and pieces of apparatus, at which men are employed making circular articles of soft porcelain.

Our frontispiece shows one of the most ancient working tools, or machines, which any branch of manufacture can exhibit—the 'potter's-wheel.' Scarcely any other machine has lived so long and undergone so little change. On the Egyptian monuments and on other records of antiquity there are representations of the potter's-wheel similar in all the essential particulars to those of our own day; indeed nothing can be more simple than the construction. In the potter himself, and not in the wheel, lies the merit of the work executed. The potter sits on a kind of stool or bench, immediately behind a small circular whirling-table. His knees are placed one on each side of the central support of the machine, so as to give him a command over it. This, which we have called the whirling-table, is simply a circular piece of wood, whose breadth is sufficient to support the widest vessel that is to be made: it is fixed on the top of a vertical stem or shaft, so that if the shaft be made to rotate, the piece of wood must rotate likewise. The apparatus is rather below the height of a common table. The clay which is to be formed into a vessel is put upon the circular board, and there remains till fashioned; the board and the shaft beneath being made to rotate horizontally, while the potter with his hands gives the form to the mass of clay.

Every potter, or 'thrower,' is attended by two boys, who are called the 'ball-maker' and the 'wheel-turner.' The former of these has before him or near him a mass of prepared clay, having precisely the quality and consistence required for the potter's operations. He separates the clay into smaller masses, each suited to the manufacture of one particular kind of vessel, and works it up into a rude kind of ball, convenient to be handled by the thrower. He is in every way the servant or helper to the thrower. The services of the 'wheel-turner' depend on the manner in which the circular piece of wood is made to rotate. In the early state of the porcelain manufacture in England, the perpendicular shaft beneath the board was put in motion by a wheel provided with spokes, which the 'thrower' moved with his foot; the labour however was so great, that this method became unsuited to the production of large articles. Another method in past times was, to have a crank in the middle of the shaft, with a long rod working upon it, and motion was given to the lathe by the rod being pushed backward and forward. The customary mode at the present day is, however, to have a rope passing from a pulley upon the perpendicular shaft to a large wheel at a distance, which wheel is turned by a boy under the directions of the 'thrower.'

With this very simple kind of lathe, and with a few small tools still more simple, does the workman proceed to fashion all those articles of porcelain which are circular in their form, whether cups, basins, or vessels of any other kinds. When the shape is too diversified to be deemed circular, other modes of formation must be adopted, of which more hereafter. Let us suppose, as an example, that a hemispherical basin is to be formed. The man places a mass of clay, in size and consistence suited for the purpose, upon the bed of his lathe or wheel, striking it down rather forcibly as a means of making it hold firmly to the wood during the process of formation. He gives directions to his 'wheel-turner' to set the machine in motion, and then forms the shapeless mass into a vessel, chiefly by his hands. With his hands, wetted in an adjacent vessel of water, he presses the clay while rotating, and brings it into a cylindrical form; this cylinder he forces again down into a lump, and continues these operations—squeezing the clay into various shapes—until he has pressed out every air-bubble from the body of clay, a precaution of very great importance. Then pressing the two thumbs on the top of the mass, he indents or hollows it, as a first germ of the internal hollow of the vessel. Once having the least semblance of a cavity within, he proceeds with a rapidity almost marvellous to give both the outward and the inward contour to the vessel. With the thumbs inside and the fingers outside, he so draws, and presses, and moulds the plastic material, as to give to the outside a convexity, to the inside a concavity, and to the whole substance an uniform consistency, without breaking the clay or disturbing the circular form of the vessel. It will be seen on a moment's consideration that this circular form is due to the rotation of the clay, while the fingers and thumbs are stationary, just as a turner

handles, the jugs with lips, and the more highly decorated articles provided with all which the 'thrower,' the 'turner,' the 'presser,' and the 'caster' can do for them. We shall next be prepared to follow them through the subsequent processes which impart that exquisite appearance so especially belonging to porcelain.

Adjacent to the buildings where the early stages of the manufacture are carried on are four 'biscuit-kilns,' in which the ware is exposed to an intense heat. These kilns are probably about fourteen feet high, and nearly as much in diameter. They are heated by fires ranged round the circumference, each kiln having eight fire-places. The whole interior capacity is fitted for the reception of the articles to be 'fired,' or 'baked.' Very great precautions are necessary in this process; for, if the smoke or flame from the fire attacked the porcelain, it would discolour it at once, and spoil it. To prevent this mischance, all the manufactured articles are put into receptacles called 'seggars,' such as are here represented: these



[Putting manufactured articles into 'Seggars.']

are made principally of a kind of fire-clay capable of resisting an intense heat; and so important are they, that the acquisition of the sort of clay fitted for the purpose has always been deemed a momentous point on the part of the manufacturer. The seggars are of various sizes, shapes, and depths, to suit the different pieces they are to contain. According to the size and shape of the articles, they are either enclosed one in each seggar, or several in each; but in the latter case precautions are taken that they should not adhere together, nor touch each other at more than two or three points: powdered flint is placed at the bottom of the seggars, and pieces of hard fire-clay are so placed within the seggar, that the articles may be supported with as little contact as possible one with another.

The piling of the seggars in the 'biscuit-kiln' is a singular arrangement. The whole interior is filled with them. The top and bottom of each seggar (the former open and the latter closed) being flat, they may be piled one on another, so that each one forms a cover for the one underneath. As the heat cannot be perfectly equalized throughout the kiln, care is taken that the larger articles shall be exposed to a higher temperature than the smaller. Thus seggar is laid upon seggar, and pile after pile built up within the kiln, till the whole is filled. Every aperture is then carefully closed—of which the main one is, of course, the door through which the men enter the kiln—and all is ready for the fires to be lighted beneath. The general appearance of the kiln while being filled is here represented.



[Placing the 'Seggars' in the 'Biscuit-kiln.']

We do not know whether it is a customary arrangement in porcelain factories generally, or whether it merely applies to the one which is the object of our visit; but here the kiln-fires are lighted at a very early hour on Friday morning, and the articles are kept exposed to a fierce white heat throughout Friday and Saturday, forty hours being about the length of time during which they are thus exposed. The precise amount of 'firing' necessary is a delicate point, to be determined only by experience: it must be sufficient to expel all the moisture, and to convert the clay into a kind of semi-vitreous earth, but not beyond this point.

The baked articles are allowed to cool gradually before being drawn from the kiln; and when so drawn they have acquired the state which is called 'biscuit.' Every article shrinks considerably while in the kiln, and the weight is very materially lessened. The biscuit-ware has a peculiarly delicate, soft, and white appearance, presenting many points of striking difference compared with its unbaked state. Every article, as taken out of the seggar, is nicely cleaned, to remove all symptoms of flint-dust, &c.; and it is then ready for the process of 'glazing,' by which the dead and

unpolished surface of the biscuit is converted into a beautiful glassy surface.

One of the most important steps in the progress of the porcelain manufacture has been the discovery of substances fitted to impart this 'glaze' to porcelain. Any of the substances which will make glass will afford a glaze to pottery; and these substances comprise various alkalies, various oxides of metals, and flint in a variety of forms: but what is the best combination to form a glaze for the more delicate kinds of porcelain is a question which has occupied much attention, not only among manufacturers, but among chemists also. In the commonest kinds of earthenware or pottery the cheapest ingredients are those most resorted to; but in costly porcelain a totally different system is pursued, the excellence of the material being a much more important matter than the smallness of the price. We believe that in this, as in the choice of clays for making the porcelain, each large establishment has a recipe of its own, derived from the experience of the proprietors.

In one part of the factory is a room called the 'dipping-room,' adjacent to four 'glaze-kilns.' In the dipping-room are troughs or wooden vessels containing the glaze, a whitish creamy liquid. The room is kept at a moderate warmth, and is provided with conveniences for placing the porcelain articles, both before and after being dipped. The pieces of 'baked' or 'fired' porcelain being brought into this room, a workman takes them up one by one, holds them in such a manner that there shall be the smallest amount of contact between them and his fingers, and dips them into the trough of glaze. By one of those manipulations which are peculiar to most occupations, he turns the vessel about, on removing it from the glaze, in such a manner that, while every part shall be coated, none shall have any superabundance but what may easily be drained off. The vessels are put down out of his hand, one by one, on a board, which is thence carried to the 'glaze-kiln placing-room.' In this latter room they are piled up in seggars, nearly in the same way as before, but with certain modifications to suit the peculiarity of the circumstances.

The glaze-kilns, like the biscuit-kilns, are each heated by eight fires, and are each filled up with piles of seggars; but in the glaze-kilns the slight opening between the several seggars of each pile is stopped with clay, to prevent more effectually the entrance of smoke and flame into the seggar. The heat for vitrifying the glaze is much less intense than for biscuit-firing, and is continued for a much smaller number of hours. The operation consists in driving off the watery parts of the glaze, and melting the vitreous part which, in a vitreous state, combines firmly with the biscuit. Where we find, in the cheaper articles of manufacture, the glaze to become discoloured, or the ware discoloured under the glaze, or the glaze intersected by myriads of minute cracks, this always indicates either that a bad choice of ingredients was made, or that the management of the glaze-kiln was injudicious; and this is one of the many points in which first-rate porcelain shows its excellence.

We have now brought the porcelain to what might be deemed a finished state, so far as regards the actual service demanded from it: but it is very rarely that such porcelain as we are now considering leaves the hands of the manufacturer in this state; it is nearly always decorated either with painting or gilding, or both, before it passes into the hands of the customer. We follow it therefore to one of the largest and most interesting rooms in the factory, known as the 'painting-room.' This is a long room, provided on both sides with rows of windows, through which an ample supply of light is obtained. Close to the windows are a range of tables, at which the painters are seated, each one with his side to the light. At the time of our visit a large number of persons were thus engaged, each one holding in his left hand some article or other of porcelain which he was painting with his right. The odour indicated that various mineral colours, mixed up with oil and turpentine, formed the material of the paint. Each man had a pallet of colour before him, which he laid on the porcelain with a camel-hair pencil, much in the same manner as a miniature-painter would do.

In China this branch of manufacture is so subdivided, that one man paints blue, another red, another yellow, &c., so that each article goes through a great number of hands during the process of painting. But in England the subdivision is more rational. One man takes flowers, another foliage, a third animals, a fourth landscape, a fifth figures, a sixth heraldic bearings, and so forth; confining themselves mainly to that which their taste and studies have enabled them to effect artistically. Consequently, in walking from one part of the painting-room to another, we witnessed in succession the labours of all these classes of artists. Each painter holds the piece of porcelain against a projecting part of his table, so as to retain it firmly; or else, if a circular ornament is to go round it, he rests it on a support which may enable it to rotate with facility. The colours employed in this process are chiefly oxides of various metals, worked up to a liquid state with spirits of tar and of turpentine, and amber oil. Those ornaments which are subsequently to present the brilliant golden appearance so familiar to us on the better kinds of porcelain, are effected by a preparation of refined gold mixed up with some of the liquids just mentioned into a dark brown colour, which has no semblance to a golden hue until after it has been burned in a kiln.

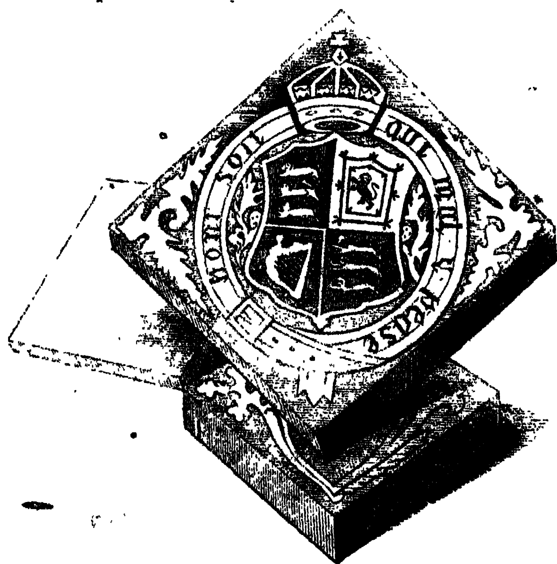
Some of the articles of porcelain have a white or unpainted ground, decorated with coloured ornaments; while others are painted over the whole surface with a ground colour, the laying on of which is the work of a particular set of painters, who show great art in the uniform tinting produced. For instance, we saw some of the painters engaged on a costly service of porcelain for the distinguished Hindoo who has recently visited England—Dwarkanauth Tagore, in which the ground was a delicate tint of green, produced by a different manipulation from that which imparts the decorative devices. In some parts of the room there were herald-painters engaged on articles of porcelain for the mess-rooms of some of our regiments and for noble families, the arms of the regiment or of the family being painted in more or less detail on each piece of porcelain. Not only are vessels for table-service thus painted, but the side slabs for fire-places and a large variety of decorative furniture are now made in porcelain, and then subjected to the taste and skill of the painter. This is one of the branches of the porcelain manufacture in which the English have made very rapid progress within the last few years.

Conveniently placed with respect to the painting-room are the 'enamel-kilns,' in which the painted articles are exposed to a heat sufficient to make the colours adhere to the porcelain. These kilns are a kind of arched oven, having a door at one end, and gratings within on which the articles are placed. The most scrupulous care and delicacy are displayed in managing these kilns, as to the temperature and length of exposure. Sometimes the painter requires to partially heat the porcelain two or three times during the process of painting, to ascertain the effect of his colours, and to combine them well with the porcelain. Indeed the care required in this process is very little less than in the exquisite one of enamel-painting.

We next follow the costly results of all the preceding labours to the 'burnishing-room,' a large apartment occupied by women and girls employed in burnishing those parts which have been gilt in the painting-room. The burnishers are formed of blood-stone and agate, brought to a very smooth surface, and variously shaped to adapt them to the curvatures of the porcelain. Each workwoman is seated at a bench with her face towards a window, holding the porcelain in the left hand, and the burnisher in her right, with which she rubs the gilded parts until they are brought to a brilliant gloss. The warehouses of the firm—of which there is one in the High Street of Worcester, and two in London, in Coventry Street and in Bond Street—illustrate in a striking degree the progress made by our manufacturers in the production of those luxurious articles for which Sèvres and Dresden obtained, in past times, such celebrity

TESSELLATED TILE MANUFACTURE.

We must in closing say a few words respecting a branch of manufacture which promises to be much extended in England, viz. *tessellated tiles* for pavements, &c. Whoever has seen the Temple Church since it has been renovated, will have noticed the beautiful pavement which it displays, formed of a vast number of rectangular tiles about six inches square, glazed on the upper surface. The establishment to which this 'visit' relates is one of those wherein tiles of this kind, a specimen or two of which are here depicted, are made.



[Tessellated Tiles.]

The tessellated tiles are formed of two differently coloured clays, one imbedded in the other, and disposed so as to form an ornamental device. The tile is first made in clay of one colour, with a depression afterwards to be filled with clay of the other colour, and this depression is formed by the aid of a mould. In the first place, the modeller models in stiff clay an exact representative of one of the tiles, about an inch thick, cutting out to the depth of about a quarter of an inch the depression which constitutes the device. When this is properly dried a mould is made from it in plaster of Paris, and from this mould all the tiles are produced one by one. The ground-colour of the tile is frequently a brownish clay, with a yellow device; but this may be varied at pleasure. Let the colour be what it may, however, the first clay is mixed up very thick, and pressed into the mould by the aid of the press seen in the next cut. On leaving the press it presents the form of a damp, heavy, uncoloured square tile of clay, with an ornamental device formed by a depression below the common level of the surface.



[Making the Tiles.]

The second-coloured clay, so far from being made stiff like the first, has a consistence somewhat resembling that of honey; and herein lies one of the niceties of manufacture, for it is necessary to choose clays which will contract equally in baking, although of different consistence when used. The tile being laid on a bench, the workman plasters the honey-like clay on it, until he has completely filled the depressed device, using a kind of knife or trowel in this process. The tile, in this state, is then allowed to dry very gradually for the long period of eight weeks, to accommodate the shrinking of the clays to their peculiar natures. After this, each tile is scraped on the surface with an edge-tool, till the superfluous portion of the second clay is removed, and the two clays become properly visible, one forming the ground and the other the device. In this state the tiles are put into a 'biscuit-kiln,' where they are baked, in a manner nearly resembling the baking of porcelain, but with especial reference, as to time and temperature, to the quality of the clays. From the biscuit-kiln they are transferred to the 'dipping-room,' where they are coated on the upper surface with liquid glaze by means of a brush. Lastly, an exposure to the heat of the 'glaze-kiln' for a period of twenty-four or thirty hours causes the glaze to combine with the clay, and the tiles are then finished.

The substance of which these tiles are made cannot be called *porcelain*, but the care required in their manufacture is such as to remove them from the rank of common pottery, and to form a sufficient reason for their being made at the very interesting establishment here described, and of which we now take our leave.



[Port of Shang-hae.]

SHANG-HAE.

SHANG-HAE, in the province of Kiang-su (which, with Anhoi, or Ngan-hoei, form what was, and still is often considered as the one province of Kiang-nan), is the most northerly of the five ports of China opened by the late treaty to British commerce. It is situated in about 31° N. lat. and 121° E. long., and is built on the left bank of the river Woo-sung, which is properly only the channel by which the waters of the Lake Tahoo or Tai (the Great Lake) are discharged into the sea. Though the course of the river probably does not exceed fifty miles, it brings down a great volume of water, and is very deep. Opposite the town of Shang-hae, which is sixteen miles from its mouth, the depth in the middle of the stream varies from six to eight fathoms, so that the largest vessels can come up to the harbour, and unload alongside of the commodious wharfs and large warehouses which occupy the banks of the river. At this place the river is nearly half a mile wide.

The town is very large. The streets are narrow, and many of them are paved with small tiles, similar to Dutch clinkers, which make a more agreeable footing than the slippery granite with which other towns in China are paved. The shops in the city are generally small, but wares of all descriptions are exhibited for sale; many of them contain European goods, especially woollens. Du Halde, in his 'Description of China,' says, that in this town and its neighbourhood 200,000 weavers are occupied in making plain cottons and muslins; and Lindsay adds, that the nankeen cloth from Shang-hae is said to be the best in the empire. Sir Hugh Gough, in his despatches after the capture of the town, says, "as a commercial city nothing can exceed it;" adding that ships of large burthen can ascend the river for several miles above the town: but though he says it appears a rich city, with "good walls in perfect repair," he states the population to be only from sixty to seventy thousand, the circumference of the walls being about three miles and a half. One of the officers of the expedition, in a recently published work*, "here observed some pretty public tea-gardens, with grottoes and labyrinths, constructed of real and artificial rocks piled curiously one above the other."

Previous to the late expedition little was known of a place which appears to be the principal emporium of Eastern Asia, and whose commerce is as active as that of any other place on the globe, not even London excepted. It is certainly a very remarkable circumstance that such a commercial town had only once been visited by a European vessel, and that not before 1832, when the Amherst, under the command of Capt. Lindsay, entered the Woo-sung river. Capt. Lindsay states—"On our arrival at Woo-sung (a small town only a mile above the mouth of the river of that name), I was so struck with the vast quantity of junks entering the river, that I caused them to be counted for several successive days. The result was, that in seven days upwards of four hundred junks, varying in size from one hundred to four hundred tons, passed Woo-sung, and proceeded to Shang-hae. During the first part of our stay most of these vessels were the north-country junks with four masts, from Teen-tsin (Thian-tsin on the Peiho) and various parts of Manchow Tartary, flour and peas from which place formed a great portion of their cargo. But during the latter part of our stay, the Fokien (Fukain) junks began to pour in to the number of thirty or forty per day. Many of these were from Formosa, Canton, the Eastern Archipelago, Cochin-China, and Siam." Now if we suppose that the commerce of Shang-hae is as active the whole year round as Capt. Lindsay found it to be in the month of

* Lieut. Murray, 'Doings in China.'

July, we come to the conclusion that this port is annually visited by shipping to the amount of five million tons. In 1838 the shipping that entered the port of London did not quite amount to four million tons: namely, 1,061,923 tons employed in the foreign trade, and 2,908,176 tons in the coasting-trade. But as Capt. Lindsay observes that the winters in these parts are rather severe, and that the snow sometimes lies several feet deep for more than a month, we may suppose that the navigation of the Woo-sung is annually interrupted for four or six weeks, and thus the commerce of Shang-hae would be reduced nearly to a level with that of London. But though the commerce of Shang-hae is perhaps more active than that of the British metropolis, its sphere is much more limited, as the most remote countries with which it is connected towards the south are Siam and the Sooloo Archipelago, towards the east Japan, and towards the north the province of Leaotong and Mandshooria, whilst London receives merchandize from all the world.

It certainly excites some surprise to find that so active a commerce is carried on in a place which has hardly any commercial relation with foreign countries. But our surprise will cease if we consider that there is no other harbour on the Chinese coast between 30° and 37° N. lat., or between the bay of Ningpo on the south, and the peninsula of Shantung on the north. On this tract of coast the two largest rivers of China, the Yellow River and the Yang-tse-kiang, enter the sea, and they bring great quantities of earthy matter, which they deposit along the coast, and thus render the whole tract inaccessible to boats beyond the size of a fishing-barge. The Yang-tse-kiang discharges itself into the Yellow Sea by a broad estuary, in the centre of which is the island of Tsong-ming; the Woo-sung falls into the Yang-tse-kiang near its embouchure, on its southern side, and being the first river which is deep enough for the purposes of navigation, the whole maritime commerce of this tract is concentrated at Shang-hae. The country which lies at the back of the coast is the most populous part of China, and contains many very large towns, among which those of Soo-choo-foo and Hang-choo-foo probably contain a million of inhabitants each, and there are others which may vary between one hundred thousand and five hundred thousand, among which is the ancient capital of China, Nankin, to all of which they have ready access by the Yang-tse-kiang, which the tide ascends for more than two hundred miles, and the Great Canal.

Nankin is the capital of the province, seated on the south bank of the river, near 32° N. lat. and 117° E. long., and about one hundred and twenty miles from its mouth. This town was the capital of the empire to the end of the thirteenth century, and at that time the largest town on the globe. To give an idea of its then extent, the Chinese historical records say, that if two horsemen were to go out in the morning at the same gate, and were to gallop round by opposite ways, they would not meet before night. This is certainly an exaggeration. The Jesuits, when surveying the town for the purpose of making a plan of it, found that the circuit of the exterior walls was thirty-seven *lies*, or nearly twenty miles. This agrees pretty well with the description given by Ellis, who estimates the distance between the gate near the river and the Porcelain Tower at about six miles, and says that an area of not less than thirty miles was diversified with groves, houses, cultivation, and hills, and enclosed within the exterior wall, which forms an irregular polygon; and is confirmed by Sir Hugh Gough in his despatches, who says, "It would not be easy to give a clear description of this vast city, or rather of the vast space encompassed within its walls. I shall therefore only observe that the northern angle reaches to within about seven hundred paces of the river, and that the western face runs for some miles along the base of wooded heights rising immediately behind it, and is then continued for a great distance upon low ground, having before it a deep canal, which also extends along its southern face, serving as a wet ditch to both. There is a very large suburb on the low ground, in front of the west and south faces, and at the south-east angle is the Tartar city, which is a separate fortress, divided from the Chinese town by high walls. The eastern face extends in an irregular line for many miles, running towards the south over a spur of Chung-san, a precipitous mountain overlooking the whole country, the base of which commands the rampart. In this face are three gates; the most northerly (the Teshing) is approachable by a paved road, running between wooded hills to within five hundred paces of the walls, whence it is carried along a cultivated flat; the next (the Taiping) is within a few hundred yards of the base of Chung-san; and that to the south (the Chanyang) enters the Tartar city. There is a long line of unbroken wall between the Teshing gate and the river, hardly approachable from swamps and low paddy (rice) land, and the space between the Teshing and Taiping gates is occupied by rather an extensive lake." Sir Hugh states the extent of the walls at about twenty miles in circumference, and their height as varying from about seventy to twenty-eight feet. Mr. Davis, who passed through Nankin in 1816, in Lord Amherst's embassage, says, in his Sketches of China, the larger portion of the area is now a mere waste, or laid out in gardens of vegetables with clumps of trees; and he was struck with their strong resemblance to modern Rome, "in as far as they consist of hills, remains of paved roads, and scattered cultivation; but the gigantic masses of ruins which distinguish modern Rome are wanting in Nankin." It is still, however, as large as most other provincial towns, the population being still estimated at three hundred thousand, and it is the residence of the first viceroy of the empire, the governor of the two Kiang provinces. "It is celebrated," says Mr. Davis, "as a seat of Chinese learning, and sends more members to the imperial college of Pekin than any other city. The books, the paper, and the printing of Nankin are celebrated through the country as being unrivalled."

The present town consists of four principal streets, running parallel to one another, and intersected at right angles by smaller ones. Through one of the larger streets a narrow channel flows, which is crossed at intervals by bridges of a single arch. The streets are not spacious, but have the appearance of unusual cleanliness. The part within the walls which is now only occupied by gardens and bamboo-groves is still crossed by paved roads, a fact which tends to confirm the statement that the whole area was once built upon.

None of the buildings of Nankin are distinguished by their architecture, except some of the gates, and the famous Porcelain Tower, which is attached to one of the pagodas or temples. This building is octagonal, and of a considerable height in proportion to its base, the height being more than two hundred feet, while each side of the base measures only forty feet. It consists of nine stories, all of equal height, except the ground-floor, which is somewhat higher than the rest. Each story consists of one saloon, with painted ceilings; inside, along the walls, statues are placed. Nearly the whole of the interior is gilded. Mr. Davis, however, says, "It is porcelain in nothing but the tiles with which it is faced." At the termination of every story, a roof built in the Chinese fashion projects some

feet on the outside, and under it is a passage round the tower. At the projecting corners of these roofs small bells are fastened, which sound with the slightest breeze. On the summit of the tower is an ornament in the form of the cone of a fir-tree: it is said to be of gold, but, probably is only gilt: it rests immediately upon a pinnacle, with several rings round it. This tower is said to have been nineteen years in building, and to have cost four hundred thousand taels.

According to the Chinese census, the country between 30° and 35° N. lat., extending from the sea about two hundred miles inland, and comprehending the ancient province of Kiang-nan, on a surface not exceeding seventy thousand square miles has a population of more than forty millions, or about six hundred inhabitants to each square mile. Such a population cannot subsist on the produce of the soil, even in the high state of agriculture by which this region is distinguished above all other parts of China. A considerable supply of provisions must be required every year. Such an inference must also be drawn from what is stated by Captain Lindsay, namely, that the northern country vessels bring chiefly corn and peas; and though he does not mention the cargoes of the Fokien vessels, which come from the Eastern Archipelago, Cochin-China, and Siam, it is a known fact that the principal article of export from these countries to China is rice. The immense quantity of grain which is carried into the port of Shang-hae is probably not consumed in that town and the neighbourhood: but a part of it reaches the centre and even the western districts of China Proper, by being conveyed on the numerous canals which are connected with the Imperial canal, or Yoon-ho, and the two great rivers above mentioned. The exports probably consist of manufactured goods, and the inhabitants pay for the food which they obtain from other countries by supplying their inhabitants with cotton, silk, and linen fabrics. The importance of the port of Shang-hae to British commerce can hardly be overrated as giving access to the northern provinces of China, whose wants are of a kind which that commerce is peculiarly able to supply, and a great part of which has been hitherto obtained through Russia, at, of course, most exorbitant prices, consequent on a land-carriage of two or three thousand miles. Mr. Charles Grant, in his examination in 1821 before the Committee of the House of Lords on the East India and China Trade, stated that the sale of European goods by the Russians at the great fair of Kiachta (which only lasts about two months), consisting chiefly of woollens, Manchester cottons, and velveteens, amounted to about a million sterling yearly; and added, that at Kiachta English velveteens were sold at as high a price as the best velvets at Canton. He also stated that "the inhabitants of the northern provinces of China, Pe-chee-lee, Shantung, &c., might receive the same description of articles, even through Canton and the great canal, cheaper than through Russia, were the transit encouraged by the Chinese; and there can be no doubt, were British vessels permitted to import into any of the ports of the Yellow Sea, that all sorts of goods might be delivered as cheap as at Canton;" but he concluded, from the jealous policy of the Chinese, that this permission would never be obtained. It has now, however, been effected; and if the Chinese have acceptable articles to give us in exchange, of which there may be some doubt, a large, new, and equally beneficial commerce to each nation may be looked forward to as the result, and by far the best result, of our military exertions.

DUDLEY—ITS CASTLE, LIME-CAVERNS, AND 'NAILERS.'

The town of Dudley, as we had occasion to notice in a recent description of the appearance of South Staffordshire at night, is situated in the heart of the midland coal-field of England, and therefore shares with the surrounding district the singular features which they present. But there is in addition, with respect to Dudley, such a strange mixture of the ancient with the modern—the feudal with the manufacturing—the solitary and romantic with the busy and bustling—as can not fail to attract the notice of those who visit the spot for the first time.

Dudley Castle, which, like many of our ancient castles, became the parent of an adjacent town, is situated on a somewhat lofty limestone hill, far above the general level of the town. This limestone seems to jut through the strata of coal and iron-stone, as if it had been urged upwards by some internal convulsion; and hence the hill itself yields neither of those two much sought-for minerals, the lime being the substance for which, commercially speaking, the hill is alone valuable. Whether the barons who built this castle were aware of the mineral riches by which they were surrounded cannot now be known; most probably they were not. But whether they were or not, the position of the castle, or skeleton of the castle, appears at the present day strangely unsuited to the ideas which we are accustomed to attach to a feudal residence. Smoking furnaces—a thick and clouded atmosphere—canals bearing barges filled with iron and coal—and working people with begrimed clothes and faces—these are the objects with which the castle is surrounded.

Let us suppose ourselves in the busy town of Dudley, and visit the castle from thence. While in the town, especially on a market-day, we witness all those active and busy scenes which are incident to the wants of a trading population: visitors from all the surrounding districts, some to buy and others to sell, crowd the streets; the shopkeepers make the best display which their stock of goods will permit; and all those features are exhibited which belong to a town enlivened by commercial activity. But when we arrive at the end of Castle-street, and apply for admission to the Castle ruins, here is a change! We leave a noisy world for a silent one—a scene marked with the features of the present day for one which tells of ages long since passed away. There is a gate, under the charge of a person employed by the present owner of the castle, through which admission (which is liberally granted to all) is gained to the grounds surrounding the castle; and when this gate is once passed, a visitor can scarcely avoid throwing off all thoughts of street bustle, and thinking what kind of men they were who built castles in past times. Before us we see a winding, ascending path, half stairs, half incline, on ascending which we gain a hill surmounted by all that now remains of Dudley Castle. The ancient outer gate, or warder's tower, still presents vestiges to show what it once was; and, having passed this, we have the remains of the keep, or donjon, in front. This was once apparently a small quadrangle, having four towers at the corners, connected by curtain walls. There now only remain two of these towers, and the one curtain wall connecting them, all else being now levelled nearly to the ground.

Within these two towers there are winding staircases, extending probably to the summit; but as they are in rather a shattered state, the ascent is prudently prevented above a certain height by doors thrown across the staircases. On ascending to the height of a few yards, and looking through the loopholes, we have unmistakeable evidence of the nature of the surround-

ing district. Flickering fires chequer the scene on every side. Whether we look northward towards Tipton, or north-east towards Wednesbury, or north-west in the direction of Sedgley, or eastward to Oldbury, or southward to Stourbridge,—the eye is pretty sure to glance upon iron-furnaces, pit-mouth hills, or coke-hills, sending up their flaming contributions to the already dense atmosphere of the district. Close beneath us we see Dudley, its streets, churches, and factories, forming a compact assemblage. In the midst of such a scene we look round at the ruins at hand, and read the tale which they tell of baronial greatness: how the foundation of the castle was laid by Dodo or Dudo, a Saxon lord, about the year 700; how the Conqueror removed the Saxon possessor, Earl Edwin, to make room for one of his followers, William Fitzausculph; how, during the reigns of the Henrys and the Edwards, it passed into the hands of various branches of Fitzausculph's family; how it came into the possession of the Dudley family in the time of Edward III.; how its possessors brought themselves into trouble during the reigns of the Tudors; and how the castle was besieged during the Commonwealth—have been fully detailed by the local historians. Suffice it here to say that the castle was almost ruined and dismantled by the Parliamentary army; rebuilt, more in the style of a mansion than a castle, soon afterwards; again nearly destroyed by fire about ninety years ago; left as an utterly neglected ruin till the beginning of the present century; and then improved in its approaches and exterior arrangements by its possessor, Lord Dudley and Ward, so far as to make a visit to the ruins a practicable and pleasant ramble.

Besides the remains of the Keep, there are fragments of walls, doorways, windows, &c., partly surrounding a green, which was once the great court-yard or quadrangle of the castle; but not a roof remains to convey an idea of the apartments of the castle. The ruins, taken as a whole, are much less picturesque, and much less connected with interesting historical events, than those of Kenilworth; but they are perhaps worthy of more notice from tourists than they seem to have received. The surrounding district is certainly almost enough to deter a lover of the picturesque; and this circumstance may have lessened the number of those who would otherwise have become acquainted with Dudley Castle.

On proceeding beyond the limits of the castle ruins, in a direction opposite to the town of Dudley, we get into the grounds belonging to the castle. These are singularly wild and secluded. There is a deep ravine, which, if found in Switzerland or Italy, would probably have furnished a subject for a host of pencils; but being found among the coal and iron districts of Staffordshire, no artist thinks of looking for it. At a first glance it is not easy to determine whether the ravine or dell is natural or the result of excavation; for it is bounded and shut in partly by rocks, and partly by verdant sides, and varied by clumps of trees. It has, however, been stated that this hollow is the result of *lime-quarries*, the excavation having been made so long a period back as to have suffered the denuded rocks to assume a vegetable clothing. Whether this be so or not, there are at the present day lime-quarries being worked at a lower level in the castle hill, in such a manner as to present caverns almost rivalling those of Derbyshire in singularity of appearance. These caverns, occasioned by the underworking of the beds of limestone, display pendant roofs, and massy columns left for their support. In groping along these caverns, the visitor often finds himself in pitchy darkness; and a rolling stone will frequently convey to him the intimation that water is flowing at a considerable depth beneath him. This water illustrates one of the many remarkable features of the district. The castle-hill is perforated by two or three canals, which proceed in profound darkness through channels or tunnels cut in the limestone rock. This is exhibited to the eye at one spot in the castle grounds, where we see a rocky sort of glen enclosing a basin, the sides of which are diversified with rugged projections, and enriched with foliage. In the rough sides of this basin are seen three openings, being tunnels belonging to three different canals which meet in this open glen. All the three are excavated in the limestone, and were constructed as a means of conveying to Birmingham and other parts the lime dug from the castle-hill. In no part of the vicinity do nature and art appear to be more oddly mingled than here.

In various parts of the vicinity lime working and burning are still carried on to a large extent. An elevated hill called the "Wren's Nest," not far distant from the castle, contains extensive lime-quarries. The lime is found in two beds, each about ten yards in thickness, separated by a space of forty yards filled with lime of an inferior quality, mixed with sand and clay. The caverns (as the excavations resulting from the labours of the quarriers are called) in the Wren's Nest Hill are highly remarkable, from the manner in which the retaining props and pillars are made to conform to the dip of the strata, and from the length and depth to which the excavations have extended.

When we leave the ravine and grounds behind the castle, we may return to the entrance by one of three paths, winding in different directions, all of which are kept in order at the expense of the proprietor of the ruins. On emerging from the gate we again find ourselves in the streets of Dudley, and surrounded by the busy operations of which it is the theatre. The shopkeepers supply the usual wares required by an active population; but it is not till we get outside the town, and in the villages between it and Birmingham, Walsall, Stourbridge, &c., that we meet with many indications of that remarkable feature which is connected with the *nail-manufacture*.

Cut-nails are made principally by machinery; wrought-nails by hand; and these latter are not made in large buildings, or factories, so much as in the humble cottages of the workmen. In passing along any of the high-roads in this neighbourhood, we may frequently see women trudging along, carrying on their heads bundles of nail-rods which they have purchased at some of the numerous iron-works, and are taking to their own homes, there to fabricate them into nails. Each rod is about six feet in length, and has a width and thickness proportionate to the size of the nail which is to be made. The rods are prepared by drawing red-hot iron bars successively through a series of holes in a steel-plate; the holes employed being smaller and smaller until the desired dimensions are produced. The rods, as thus produced, are much longer than six feet; but they are reduced to that length in order to facilitate the formation of them into convenient bundles; and it is with such bundles that we frequently see the labouring women of the district laden. A walk along the same roads will afford us indications of one among the causes of the location of the nail-manufacture, and many similar manufactures, in this quarter; we mean, the abundant supply of coal. Carts are traversing the country in every direction, drawn by one horse each, and filled with Staffordshire coal, generally in pieces of such size as would win for it the approving term of "nubbly coal" in London; purchaseable, too, at a price considerably less than one-half of that paid in the metropolis.

If we follow one of these 'nailers' to her home, we shall probably find it a low, dismal-looking, comfortless brick house, exhibiting cracks and fissures which

would alarm most persons. The nature of the district affects the buildings, as well as the people and the atmosphere. The whole ground beneath is so completely honeycombed by the operations of the miners, that if care be not taken to cease working within a few feet of the surface, the latter often sinks, and injures whatever structures may be erected on it. This does not imply that the ground actually breaks in and leaves an open fissure or chasm, but that a subsidence takes place sufficient to shake all above. Some of the poorer houses about Oldbury have chains wound about them, to keep them up.

The nailers have small forges within their houses, at which they work in companies, women as well as men. Hutton's description of the female nailers has been often quoted, for the oddness of the scene itself, and the quaint language in which he records it. While speaking of Birmingham, he says:—"The art of nail-making is one of the most ancient among us; we safely charge its antiquity with four figures. We cannot consider it a trade *in* so much as *of* Birmingham; for we have but few nail-makers left in the town; our nailers are chiefly masters, and rather opulent. The manufacturers are so scattered around the country, that we cannot travel far, in any direction, out of the sound of the nail-hammer. But Birmingham, like a powerful magnet, draws the produce of the anvil to herself." Then comes his description of the nail smithy:—"When I first approached here from Walsall, in 1741, I was surprised at the number of blacksmiths' shops upon the road; and could not conceive how a country, though populous, could support so many people of the same occupation. In some of these shops I observed one or more females, stripped of their upper garment, and not overcharged with their lower, wielding the hammer with all the grace of the sex. The beauties of their face were rather eclipsed by the smut of the anvil; or, in poetical phrase, the tincture of the forge had taken possession of those lips which might have been taken by the kiss. Struck with the novelty, I inquired, 'Whether the ladies in this country shod horses?' but was answered, with a smile, 'They are nailers.'"

There the nailers are still located, much as they were when Hutton first saw them a hundred years ago. They still use the forge to heat the iron-rod, the anvil on which, and the hammer by which, to fashion the nail, and still make the nails one by one; and, without using Hutton's "poetical phrase," we may still consider the occupation to be somewhat of the dirtiest. It constitutes one of the remarkable features in the district of which Dudley may be deemed the centre.



[Fort Erie, on Lake Erie, in 1770.]

THE NIAGARA DISTRICT, WESTERN CANADA.—No. III.

The Niagara district, being already settled, does not offer any inducement to the usual description of emigrants, who proceed to Canada for the purpose of purchasing land, and by their industry bringing the wild forest into a state of cultivation; but persons with capital may do well to settle in this part of the province. They can purchase farms already cleared, and the vicinity of good markets at once compensates them for the higher price which they must pay. To those who are incapable of 'roughing' it in 'the bush,' such a plan is undoubtedly the best. Both in the British provinces and in the United States there are a class of men who employ themselves in clearing land, and after bringing it into a rude state of cultivation, they sell their 'clearings,' and these useful pioneers are again off into the woods. This is a very beneficial distribution of labour, and renders the task of the more refined emigrant comparatively light. The infinite diversity of taste and habit amongst our countrymen who choose to reside on the continent of Europe, in many cases to retrench their expenditure, renders it probable that some of them would effect their purpose more readily by a residence of a few years in the Niagara district, if unhappily it were not the dissipation of the European capitals which constituted the charm of the old continent; but still, as we have already remarked, a different taste might lead others to prefer

the shores of Lake Erie. The beauties of Nature, and the grand and novel features which she here presents, would surely to a rightly constituted mind be more attractive than the lounging habits of a second-rate town in France. There is no lack of field-sports and of other amusements which agreeably diversify the life of a man who is not pursuing some settled plan of existence, but merely resting for a time for some specified object. In summer the tour of the lakes might be made, the adjacent parts of the States visited, and the cities of Montreal, Quebec, Albany, Boston, and New York are each within two or three days' journey. In a short time new and more correct views would be obtained of a state of things differing greatly in many points from that which the emigrant had quitted. It is said that those who have once resided in new settlements where the forms of society are comparatively free and unconstrained, seldom relish, on their return to an old community, the hollow formalities by which they are circumscribed, and look back with regret to their former freedom, so that a temporary sojourn might, in the case we have supposed, become a permanent settlement.

Eastern and Western Canada, under a united constitutional government, such as they have now obtained, and aided by the stream of emigration from the mother-country, which is pouring in at the rate of above thirty thousand persons yearly, is likely to increase rapidly in population. In the speech with which the late Lord Sydenham opened the first session of the United Legislature of Canada he pointed out the importance of measures for developing the resources of the country by extensive public works, observing that "the rapid settlement of the country,—the value of every man's property within it,—the advancement of his future fortunes, are deeply affected by this question." The objects which he pointed out as promising commensurate returns for a great outlay, were the improvement of the navigation from the shores of Lake Erie and Lake Huron to the ocean, and the establishment of new internal communications in the inland districts. The Welland canal already places in the hands of the merchants of Kingston and Montreal the command over the produce of the western parts of the United States and the most fertile grain districts in Western Canada, which can reach the Atlantic for exportation to Europe, the West Indies, &c. in a considerably shorter time than if the products of the above districts were conveyed to New York by the Erie canal. An improvement of this nature benefits the most remote settler in the backwoods, increases the value of his labour, and brings around him, much sooner than would otherwise be the case, all the most important influences of civilization.

THE SURF AND THE BORE OF INDIA.

AMONG the geographical, or rather hydrographical, features which distinguish the great continent of India, there are two of a very remarkable kind—the *surf* and the *bore*, the former presenting a formidable obstacle to the approach of ships towards the port of Madras, and the latter occurring near the mouths of the great Indian rivers, such as the Indus and the Ganges.

Madras is one of the most unfavourably situated cities which have ever risen to eminence; for such is the state of the sea near it, that no ships can approach the shore, and all communications between them and the city are maintained by boats and rafts, the crews of which go through no small amount of danger in the transit. The site of the city appears to have been determined on more by accident than design, or such a formidable obstacle to freedom of communication would not have escaped notice. In front of the city the surf rages in three distinct foamy ridges, which can only be passed safely by small vessels built expressly for the duty. These vessels are called *massoolahs*.

The massoolah is a light, large, and flat-bottomed boat, without ribs, keel, or other timber; the broad planks being sewed at the edges with 'kyar,' or line made from the outer fibres of the cocoa-nut, and are filled in between the seams with the same material. Iron is utterly excluded from the whole fabric. By this construction the massoolah is rendered lithe and buoyant enough to meet the violent shocks which it will have to encounter from the roaring surge; it yields to the percussion of the waters, so as, by diminishing the resistance, to be thrown up safely on the beach without breaking by the concussion. The management of these boats requires great dexterity and experience, the crews being bred from their infancy to the hazardous enterprise. The massoolahs are impelled by broad elliptical paddles; and the 'tindál,' or master, chants a wild kind of song, to the cadence of which his 'clashees,' or rowers, keep time, quickening or retarding the motion of the boat as may be necessary to evade or encounter the stroke of the surf. Thus they approach the European vessels, which are obliged to anchor at the back of the surf at a prescribed distance; and the passengers and ladies are then transferred from the larger vessel to the massoolah. They then return; and on entering the outer line of surf, which is said to appal every one who encounters it for the first time, the rowers simultaneously pause, and the song is suppressed; but the instant the surf has tumbled over, a loud shout bursts forth, and the most skilful and strenuous efforts are made to meet the next ridge of surf, towards which the massoolah is whirled with awful rapidity; and so on till they reach the shore.

The massoolah is always attended by little rafts, called *catamarans*, to aid in rescuing the passengers and bearing them to the shore in the event of the massoolah being upset. In very rough weather the whole line of coast becomes terrific; the massoolahs cannot venture out; and all intercourse with the shipping would then be stopped, except for the means afforded by the catamarans. This simple and singular contrivance consists of two or three logs of light wood lashed together, the outer ones being seven or eight feet long, by six or eight inches diameter, and the centre one rather longer. It is rounded off at one end, for the convenience of progression through the water, and is paddled by one or two men, who squat on their knees, in a position which appears to an Englishman a most uneasy one. The surface is flat, and is level with the water when the men are properly seated in the centre. The water is continually washing over them, and yet these men will remain thus for hours together. It is very common for them to be washed off the catamaran; but if they escape the sharks, which are looking out for prey, they regain their position by expert swimming. Drenched as they are with water, these men yet contrive to convey letters and despatches between the ships and the shore without getting them wetted: the papers are usually placed in their skull-caps, enveloped with a kind of turban, which, with a cloth round their middle, are the only articles of dress they require.

The catamaran-men often receive medals of distinction from the Indian government for having saved the lives of persons who have been upset from the massoolahs. The singularity in the nature of the surf which these men have to encounter is, that it is often most violent in calm weather; hence there frequently occurs sad destruction of shipping in the Madras Roads. A writer in a recent volume of the 'United Service Journal,' describing the Madras surf from personal observation, gives the following as one among many instances of the dangerous character of the spot

for shipping:—"On the 2nd May, 1811, Madras was visited by a storm of such fury as to create both destruction and sorrow. Before the commotion of the elements began, one hundred and twenty ships and vessels proudly rode at their anchors: in the morning all these, including H.M. ships Dover and Chichester, either bilged or foundered, and were strewed in fragments along the shore. Fewer lives were sacrificed than could have been expected, considering the extent of the calamity, and that numbers of the vessels sunk at their anchors; but neither of the men-of-war lost a single man. It is, however, quite frightful to ponder on the extent to which our naval means would probably have been destroyed had this storm come on sooner. But ten days before the expedition had sailed for Java, with a strong squadron of men-of-war, twelve Company's cruizers, and sixty transports, with twelve thousand soldiers on board, all of which must have been wrecked."

It is not yet clearly proved how this formidable surf may be most correctly accounted for. The probabilities are, that the formation of the coast near Madras, the narrowing of the Bay of Bengal as it recedes towards the north, the flowing of the equatorial current against the coast, and the nature of the bottom, as to depth, shoals, &c., all exert their influence in the production of the surf; but, to what extent, future hydrographical researches must show.

Let us next pass on to notice the 'bore,' or rushing tide, at the mouths of some of the Indian rivers. This is a remarkable periodic phenomenon, depending in some way on the flow of the tide into an estuary not calculated to give sufficient space for the due reception of the waters. The Ganges, the Indus, and the Bay of Cambay are the parts of India where this remarkable rush of waters takes place. We will take the accounts of these bores from travellers who have visited the respective spots.

The Rev. Hobart Caunter, in one of the volumes of the 'Oriental Annual,' gives an account of the bore at the Ganges*. It may be proper to premise that the Ganges enters the Bay of Bengal by innumerable mouths, none of which are navigable for large ships except that branch called the Hooghly, on the banks of which the city of Calcutta is built. The Hooghly passes by Calcutta with a broad, deep, and tranquil current; but between the city and the sea there are many shoals and sandbanks. On this branch of the river occurs the bore, a violent flux of the water, which rushes up the stream at certain intervals with such extreme violence as to swamp everything within its influence. Its power is chiefly confined to the sides of the river, being scarcely felt in mid-channel, where the Indiamen generally lie at anchor.

This sudden influx of the tide commences at Hooghly Point, where the river first contracts its width, and is perceptible above Hooghly Town. So quick is its motion, that it hardly employs four hours in travelling from one to the other, although the distance is nearly seventy miles. It does not run on the Calcutta side, but along the opposite bank, from whence it crosses at Chitpoor, about four miles above Fort William, and proceeds with great violence in its upward course. At Calcutta it sometimes occasions an instantaneous rise of five feet. So impetuous is the rush of the water, that if small vessels at anchor are not prepared to receive it, they must be infallibly upset. Ships at anchor, being generally in mid-channel, where its influence is little felt, escape with a few uneasy rolls. If, however, larger vessels are overtaken by it, the shock is prodigious, and at times serious mischief ensues, especially if they are struck upon the broadside. By turning their prows towards the current little or no injury is sustained. The bore rises commonly to the height of eighteen feet, and invariably produces a sensation of great terror near the shore, where small boats are always moored in considerable numbers; and much alarm is excited when one of the visits of this formidable enemy is expected, for the frequency of its occurrence has not by any means had the effect of calming apprehension.

* For a notice of the Ganges, and a view of the 'bore' from a drawing by Mr. W. Westall, see No. 162

In the river Brahmapootra, which enters the Bay of Bengal, not far from the eastern mouth of the Ganges, the bore is witnessed, of a similar character to the above. In the channels between the islands near the mouth of the river, the height of the bore is said to exceed twelve feet; and it is so terrific in its appearances, and so dangerous in its consequences, that no boat will venture to navigate there at spring-tide. It does not, however, ascend to so great a distance up the Brahmapootra as up the Ganges, probably on account of some peculiar conformation of the shores.

The late lamented Sir Alexander Burnes, when speaking of the Indus, in the following terms described the bore often observed at that river:—"The tides rise in the mouths of the Indus about nine feet, at full moon; and flow and ebb with great violence, particularly near the sea, where they flood and abandon the banks with equal and incredible velocity. It is dangerous to drop the anchor unless at low-water, as the channel is frequently obscured, and the vessel may be left dry." The description of the passage of Alexander's boats down the Indus, as given by Arrian, was the first intimation given of this rushing tide, and serves to corroborate other portions of the testimony.

In the Gulf of Cambay there is a very remarkable bore, arising from the peculiar formation of the coast. It will be seen by inspecting a map, that this gulf runs up between Bombay and the peninsula of Guzerat in the western coast of India; that it is very irregular in shape, that it runs deeply into the land, and that several rivers flow into it. Many shoals occur in different parts of the gulf, by which the flood of waters occasioned by the tides are divided into various channels or distinct currents; and up two of the principal of these currents the phenomenon of the bore is observed. Lieutenant Ethersey, of the Indian navy, communicated to the Geographical Society, a few years ago, an account of these two bores, and of an observation which he made in person on one of them. In February, 1835, in order to try the effect of the bore on a large-sized 'bander-boat,' and at the same time to ascertain the strength of the stream after the wave had passed, Lieut. Ethersey anchored the boat at spring-tide half a mile to the northward of what was then the last cape on the western side of the gulf. Although the anchorage was in five fathoms, the boat grounded at low-water, and was left high and dry. A few hours afterwards, the noise of the bore was heard, when every precaution was immediately taken for the safety of the boat. The night was still and calm, and the roar of the rushing tide, as it approached, echoing among the neighbouring cliffs, is described as having been truly awful. The bore struck the boat, lifted her, and threw her violently round on her bilge; in which position she was forced before it, broadside on, for the space of five minutes, the grapnel being of no use, for it was carried faster than the boat. So violently was the boat shaken, that her commander thought she would go to pieces. However, no accident happened; for, on getting to a hollow in the sand-bank, which was quickly filled, the boat righted. By subsequent experiments made with the log-line, it was found that the bore rushed up with a velocity of about ten 'knots' an hour.

The same volume of the Society's Journal in which

Lieutenant Ethersey's observations are recorded contains also a letter from Captain Jervis of the Company's Service, relative to the same subject. He crossed the Gulf of Cambay, in a small schooner of about thirty tons burden, manned by sailors from Gogoh, a class of people who are remarkably courageous and expert at sea. "The coolness and dexterity with which they secured and righted the vessel on the rush of the first wave," says he, "is still fresh in my memory, and I remarked, that in casting anchor every day, as the tide went out, when the vessel grounded in the mud, the tindal, or master, of the vessel invariably took the precaution of selecting some spot in the direct line of its progress, that is, in the main channel, where he said there was less danger to be apprehended than in the neighbourhood of the shores, in consequence of the recoil or curl of the tide alongshore, and the falling in of the loose banks. The bore appeared to set in like a straight wall of water with a head of five or six feet, each succeeding wave decreasing more and more, till the whole gulf was reduced to the same level as the sea without. We heard it approach several minutes before it came upon us, when we were fairly lifted up, and afloat in an instant."

This phenomenon of the bore has been thus accounted for. From a comparison of those rivers of India which exhibit the bore with those which do not, it seems necessary for the production of this effect that the rivers should fall into an estuary, that this estuary be subject to high tides, and that it contract gradually, and lastly, that the river also narrow by degrees. The rise of the sea at spring-tides drives a great volume of water into the wide entrance of the estuary, where it accumulates not being able to flow off quick enough into the narrower part. The tide therefore enters with the greater force the narrower the estuary becomes; and when it reaches the mouth of the river the swell has already obtained a considerable height above the descending stream, and rushes in like a torrent. It is as if water were entering into a funnel-shaped mouth which becomes too small to give it adequate room, and hence the same phenomenon may be exhibited in the Gulf of Cambay as in the Indian rivers, if the form of the coasts be alike.

The bore is exhibited, to a greater or less extent, on the shores of Brazil, in the rivers Araquari and Meary, and in England on a small scale in the Severn, the Trent, the Wye, and the Solway Frith.

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Geography and History.—I said that geography held out one hand to geology and physiology, while she held out the other to history. In fact, geology and physiology themselves are closely connected with history. For instance, what lies at the bottom of that question which is now being discussed everywhere—the question of the corn-laws—but the geological fact that England is more richly supplied with coal mines than any other country in the world? What has given a peculiar interest to our relations with China, but the physiological fact, that the tea plant which is become so necessary to our daily life, has been cultivated with equal success in no other climate or country? What is it which threatens the permanence of the union between the northern and southern states of the American confederacy, but the physiological fact, that the soil and climate of the southern states render them essentially agricultural, while those of the northern states combined with their geographical advantages as to sea ports, dispose them no less naturally to be manufacturing and commercial? The whole character of a nation may be influenced by its geology and physical geography. But for the sake of its mere beauty and liveliness, if there were no other consideration, it would be worth our while to acquire this richer view of geography. Conceive only the difference between a ground-plan and a picture. The mere plan-geography of Italy gives us its shape, as I have observed, and the position of its towns; to these it may add a semicircle of mountains round the northern boundary to represent the Alps, and another long line stretching down the middle of the country to represent the Apennines. But let us carry on this a little further, and give life, and meaning and harmony to what is at present at once lifeless and confused. Observe, in the first place, how the Apennine line, beginning from the southern extremity of the Alps, runs across Italy to the very edge of the Adriatic, and thus separates naturally the Italy Proper of the Roman from Cisalpine Gaul. Observe, again, how the Alps after running north and south, where they divide Italy from France, turn then away to the eastward, running almost parallel to the Apennines, till they too touch the head of the Adriatic on the confines of Istria. Thus between these two lines of mountains there is enclosed one great basin or plain, enclosed on three sides by mountains, open only on the east to the sea. Observe how widely it spreads itself out, and then see how well it is watered. One great river flows through it in its whole extent, and this is fed by streams almost unnumbered, descending towards it on either side from the Alps on the one side, and from the Apennines on the other. Who can wonder that this large and rich and well watered plain should be filled with flourishing cities, that it should have been contended for so often by successive invaders? Then descending into Italy Proper, we find the complexity of its geography quite in accordance with its [illegible] political division. It is not one simple central ridge of mountains, leaving a broad belt of level country on either side between it and the sea, nor yet is it a chain rising immediately from the sea on one side, like the Andes in South America, and leaving room, therefore, on the other side for wide plains of table land, and rivers with a sufficient length of course to become at last great and navigable. It is a back bone thickly set with spines of unequal length, some of them running out at regular distances parallel to each other, but others twisted so strangely, that they often run for a long way parallel to the back bone, or main ridge, and interlace with one another in a maze almost inextricable. And, as if to complete the disorder, in those spots where the spines of the Apennines being twisted round run parallel to the sea and to their own central chain, and thus leave an interval of plain between their bases and the Mediterranean, volcanic agency has broken up the space thus left with other and distinct groups of hills of its own creation, as in the case of Vesuvius and of the Alban hills near Rome. Speaking generally, then, Italy is made up of an infinite multitude of valleys pent in between high and steep hills, each forming a country to itself, and cut off by natural barriers from the others. Its several parts are isolated by nature, and no art of man can thoroughly unite them. Even the various provinces of the same kingdom are strangers to each other; the Abruzzi are like an unknown world to the inhabitants of Naples, insomuch, that when two Neapolitan naturalists, not ten years since made an excursion to visit the Majella, one of the highest of the central Apennines, they found there many medicinal plants growing in the greatest profusion, which the Neapolitans were regularly in the habit of importing from other countries, as no one suspected their existence within their own kingdom. Hence arises the romantic character of Italian scenery, the constant combination of a mountain outline and all the wild features of a mountain country with the rich vegetation of a southern climate in the valleys. Hence too the [illegible], the pastoral simplicity, and the [illegible] robber habits to be found in the population; so that to this day you may travel in many places for miles together in the plains and valleys without passing through a single town or village; for the towns still cluster on the mountain sides, the houses nestling together on some scanty ledge, with cliffs rising above them and sinking down abruptly below them, the very [illegible] precipitous oppida saxis of Virgil's description, which he [illegible] then called "Antique walls," because they had been the strongholds of the primeval inhabitants of the country, and which are still inhabited after a lapse of so many centuries, nothing of the stir and movement of other parts of Europe having penetrated into those lonely valleys, and tempted the people to quit their mountain fastnesses for a more accessible dwelling in the plain. I have been led on further than I intended, but I wished to give an example of what I meant by a real and lively knowledge of geography, which brings the whole character of a country before our eyes, and enables us to understand its influence upon the social and political condition of its inhabitants. And this knowledge, as I said before, is very important to enable us to follow clearly the external revolutions of different nations, which we want to comprehend before we penetrate to what has been passing within.—*Dr. Arnold's Lectures on History.*



ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. III.

Giotto,

Born 1276, died 1336.

> "Credette Cimabue nella Pittura
> Tener lo campo, ed ora ha Giotto il grido;—
> Sicchè la fama di colui oscura."

> "—— Cimabue thought
> To lord it over painting's field; and now
> The cry is Giotto's, and his name eclips'd."
>
> *Carey's Dante.*

These often-quoted lines, from Dante's 'Purgatorio,' must needs be once more quoted here: for it is a curious circumstance that, applicable in his own day, five hundred years ago, they should still be so applicable in ours. Open any common history not intended for the very profound, and there we still find Cimabue "lording it over painting's field," and placed at the head of a revolution in art, with which, as an artist, he had little or nothing to do,—but much as a man; for to him—to his quick perception and generous protection of talent in the lowly shepherd-boy, we owe Giotto, than whom no single human being of whom we read had, in any particular department of science or art, a more immediate, wide, and lasting influence. The total change in the direction and character of art must in all human probability have taken place sooner or later, since all the influences of that wonderful period of regeneration were tending towards it. Then did architecture struggle as it were from the Byzantine into the Gothic forms, like a mighty plant putting forth its rich foliage and shooting up towards heaven; then did the speech of the people—the *vulgar tongues*, as they were called—begin to assume their present structure, and become the medium through which beauty, and love, and action, and feeling, and thought were to be uttered and immortalized; and then arose Giotto, the destined instrument through which his own beautiful art was to become not a mere fashioner of idols, but one of the great interpreters of the human soul with all its "infinite" of feelings and faculties, and of human life in all its multifarious aspects. Giotto was the first painter, who "held as it were the mirror up to nature." Cimabue's strongest claim to the gratitude of succeeding ages is, that he bequeathed such a man to his native country and to the world.

About the year 1289, when Cimabue was already

old and at the height of his fame, as he was riding in the valley of Vespignano, about fourteen miles from Florence, his attention was attracted by a boy who was herding sheep, and who, while his flocks were feeding around, seemed intently drawing on a smooth fragment of slate, with a bit of pointed stone, the figure of one of his sheep as it was quietly grazing before him. Cimabue rode up to him, and looking with astonishment at the performance of the untutored boy, asked him if he would go with him and learn; to which the boy replied, that he was right willing, if his father were content. The father, a herdsman of the valley, by name Bondone, being consulted, gladly consented to the wish of the noble stranger, and Giotto henceforth became the inmate and pupil of Cimabue.

This pretty story, which was first related by Lorenzo Ghiberti, the sculptor (born 1378), and since by Vasari and a thousand others, luckily rests on evidence as satisfactory as can be given for any events of a rude and distant age, and may well obtain our belief, as well as gratify our fancy; it has been the subject of many pictures, and is prettily introduced in Rogers's 'Italy:'

> "—— Let us wander thro' the fields
> Where Cimabue found the shepherd-boy
> Tracing his idle fancies on the ground."

Giotto was about twelve or fourteen years old when taken into the house of Cimabue. For his instruction in those branches of polite learning necessary to an artist, his protector placed him under the tuition of Brunetto Latini, who was also the preceptor of Dante. When, at the age of twenty-six, Giotto lost his friend and master, he was already an accomplished man as well as a celebrated painter, and the influence of his large original mind upon the later works of Cimabue is distinctly to be traced.

The first recorded performance of Giotto was a painting on the wall of the Palazzo dell' Podestà, or council-chamber of Florence, in which were introduced the portraits of Dante, Brunetto Latini, Corso Donati, and others. Vasari speaks of these works as the first successful attempts at portraiture in the history of modern art. They were soon afterwards plastered or whitewashed over during the triumph of the enemies of Dante; and for ages, though known to exist, they were lost and buried from sight. The hope of recovering these most interesting portraits had long been entertained, and various attempts had been made at different times without success, till at length, as late as 1840, they were brought to light by the perseverance and enthusiasm of Mr. Bezzi, an Italian gentleman, now residing in England. On comparing the head of Dante, painted when he was about thirty, prosperous and distinguished in his native city, with the later portraits of him when an exile, worn, wasted, embittered by misfortune and disappointment and wounded pride, the difference of expression is as touching as the identity in feature is indubitable.

The attention which in his childhood Giotto seems to have given to all natural forms and appearances, showed itself in his earlier pictures; he was the first to whom it occurred to group his personages into something like a situation, and to give to their attitudes and features the expression adapted to it: thus, in a very early picture of the Annunciation he gave to the Virgin a look of fear; and in another, painted sometime afterwards, of the Presentation in the Temple, he made the Infant Christ shrink from the priest, and turning, extend his little arms to his mother—the first attempt at that species of grace and naïveté of expression afterwards carried to perfection by Raffaelle. These and other works painted in his native city so astonished his fellow-citizens, and all who beheld them, by their beauty and novelty, that they seem to have wanted adequate words in which to express the excess of their delight and admiration, and insisted that the figures of Giotto so completely beguiled the sense that they were mistaken for realities. A commonplace eulogium, never merited but by the most commonplace and mechanical of painters.

In the church of Santa Croce, Giotto painted a Coronation of the Virgin, still to be seen, with choirs of angels on either side. In the refectory he painted the Last Supper, also still remaining; a grand, solemn, simple composition, which, in the endeavour to give variety of expression and attitude to a number of persons,—all seated, and all but two actuated by a similar feeling, must still be regarded as extraordinary. In a chapel of the church of the Carmine at Florence, he painted a series of pictures from the life of John the Baptist. These were destroyed by fire in 1771; but, happily, an English engraver, then studying at Florence, named Patch, had previously made accurate drawings from them, which he engraved and published. The two angels in the wood-cut at the head of this article are copied from one of these engravings. A fragment of the old fresco, containing the heads of two of the Apostles, who are bending in grief and devotion over the body of St. John, is now in the collection of Mr. Rogers, the poet. It certainly justifies all that has been said of Giotto's power of expression, and, when compared with the remains of earlier art, more than excuses the wonder and enthusiasm of his contemporaries.

The pope, Boniface VIII., hearing of his marvellous skill, invited him to Rome; and the story says, that the messenger of his Holiness, wishing to have some proof that Giotto was indeed the man he was in search of, desired to see a specimen of his excellence in his art. hereupon, Giotto taking up a sheet of paper, traced on it with a single flourish of his hand a circle so perfect that "it was a miracle to see;" and (though we know not how or why) seems to have at once converted the pope to a belief of his superiority over all other painters. This story gave rise to the well-known Italian proverb, "*Più tondo che l'O di Giotto*" (rounder than the O of Giotto), and is something like a story told of one of the Grecian painters: but to return. Giotto went to Rome, and there executed many things which raised his fame higher and higher; and among them, for the ancient Basilica of St. Peter's, the famous mosaic of the *Navicella*, or the *Barca*, as it is sometimes called. It represents a ship, with the Disciples, on a tempestuous sea; the winds, personified as demons, rage around it. Above are the Fathers of the Old Testament; on the right stands Christ, raising Peter from the waves. The subject has an allegorical significance, denoting the troubles and triumphs of the Church. This mosaic has often changed its situation, and has been restored again and again, till nothing of Giotto's work remains but the original composition. It is now in the vestibule of St. Peter's at Rome.

For the same Pope Boniface, Giotto painted the Institution of the Jubilee of 1300, which still exists in the Lateran at Rome.

In Padua Giotto painted the chapel of the Arena with frescoes from the life of Christ and the Virgin, in fifty square compartments. Of this chapel the late Lady Callcott published an interesting account: there is exceeding grace and simplicity in some of the outline groups with which her work is illustrated, particularly the Marriage of the Virgin and St. Joseph. At Padua Giotto met his friend Dante; and the influence of one great genius on another is strongly exemplified in some of his succeeding works, and particularly in his next grand performance, the frescoes in the church of Assisi. In the under church, and immediately over the tomb of St. Francis, the painter

represented the three vows of the Order—Poverty, Chastity, and Obedience; and in the fourth compartment, the Saint enthroned and glorified amidst the host of Heaven. The invention of the allegories under which Giotto has represented the vows of the Saint, his Marriage with Poverty—Chastity seated in her rocky fortress—and Obedience with the curb and yoke, are ascribed by a tradition to Dante*. Giotto also painted, in the Campo Santo at Pisa, the whole history of Job, of which only some fragments remain.

[To be continued.]

* In the 'Divina Commœdia' ('Paradiso,' c. xi.), Dante describes the marriage of St. Francis and Poverty in words which seem only to have been rendered into form by the painter.

ECONOMICAL USES OF THE BIRCH-TREE.

The Birch is one of that numerous list of forest-trees for which man has—in almost every part of the temperate climates—reason to be grateful. Its wood, its bark, its leaves, all are brought into profitable employment, in some cases by the ruder natives more than by those in which civilization has made further progress; but in other cases, by the artizans of such a country as England, more than by those less skilled. The common or European birch is the species which affords the largest variety of uses; but we may notice a few others in combination with it.

The general character of birch-trees is as follows:—They are natives of Europe, chiefly of the most northern parts, or of high elevations in the south; of North America: and of some parts of Asia. They are generally found in mountainous rocky situations in the middle of Europe; but they grow wild in plains and peaty soils in the northern regions. The common birch is one of the hardiest of known trees; and there are only one or two other species of ligneous plants which approach so near to the north pole. The common birch has been known from the earliest ages; and it has long been a most valuable tree to the inhabitants of the extreme north of Europe; as the kind called the canoe-birch has been to those of North America.

The common birch is a diminutive shrub in the extreme north; but in the middle regions of Europe it becomes a tree of fifty or sixty feet in altitude. In the latter case it is known from all other forest-trees by the silvery whiteness of its outer bark; and this bark constitutes one of the most valuable products of the tree. The birch has been more or less known from remote times, and has been noticed both by the classic writers and by poets. According to Pliny and Plutarch, the celebrated books which Numa Pompilius composed about seven hundred years before Christ, and which were buried with him on Mount Janiculum, were written on the bark of the birch-tree. In the early days of Rome, the lictors had their *fasces* made of birch branches, which they carried before the magistrates to clear the way. The branches were formerly used in England for ornamenting the houses during Rogation-week, in the same manner as holly now is at Christmas; and Gerard tells us that they "serve well to the decking up of houses, and banqueting-rooms for places of pleasure." There is one notice of the use of birch, in past writers, which, if it do not occur at once to the mind of a reader, will be easily brought to his recollection. Evelyn says that birch cudgels were used by the lictors, as now the gentler rods by our tyrannical pedagogues, for lighter faults." Gerard observes, too, that in his time "parents and schoolmasters do terrify their children with rods made of birch." A foreign writer remarks that the sight of a birch-tree "offers a vast subject of interesting meditation; but happy the man to whom its flexible pendent branches do not recall to mind that they were formerly instruments of punishment to him." Lastly we may quote from Shenstone's 'Schoolmistress:'

> "And all in sight doth rise a birchen tree,
> Which Learning near her little dome did stow:
> Whilome a twig of small regard to see,
> Though now so wide its waving branches flow,
> And work the simple vassals mickle woe:
> For not a wind might curl the leaves that blew
> But their limbs shudder'd, and their pulse beat low;
> And, as they look'd, they found their horror grew,
> And shaped it into rods, and tingled at the view."

But leaving the scholastic use (or abuse) of the birch, let us turn our attention to the services which the tree renders in the various arts of life. Mr. Loudon has collected a surprising list of such uses.

The wood of the common birch is white, shaded with red; of a medium durability in temperate climates, but lasting a long time when it is grown in the extreme north. The grain of the wood is moderately fine, and it is worked with more facility in the green than in the dry state. The wood of old trees is both harder and heavier than that of young ones. It soon rots when laid on the ground in heaps: and, therefore, immediately after the trees are felled it is deemed advisable to convey them at once to the timber-yard, without leaving them to exposure in the forests. The wood is employed by wheelwrights in France for the felloes of wheels; and, in the interior of Russia, in the construction of small rustic carriages; the felloes of the wheels being sometimes made of one entire stem of a young birch-tree, bent by heat, and retained in its place by ties of the spray. On the Continent, chairs, and many kinds of furniture, are made of birch-wood; and many articles of cooperage and turnery; as also sabots. For cabinet-making, the birch is of little use till it has attained the age of sixty or eighty years, as previously the wood is liable to warp and to be attacked by worms. The tree occasionally produces knots of a reddish tinge, marbled, light, and solid, but not fibrous; and of these the Laplanders make cups and bowls by means of sharp knives, and turners also seek for such specimens. In the Highlands of Scotland the wood of the birch is used in a singular variety of ways: it has been said that the Highlanders "make everything of it: they build their houses of it: make their beds, chairs, tables, dishes, and spoons of it; construct their mills of it; make their carts, ploughs, barrows, gates, and fences of it; and even manufacture ropes of it." Evelyn mentions two uses of birch wood which seem now to be obsolete:—"from the whitest part of the old wood, found commonly in doating birches, is made the ground of our effeminate farined gallants' sweet-powder;" and "of the quite consumed and rotten wood is gotten the best mould for the raising of divers seedlings of the rarest plants and flowers."

Directing our attention next to the branches and the spray on young shoots, we find an extraordinary variety of services rendered by them in different countries. These portions of the tree make hoops, brooms or besoms, ties for faggots, baskets, wicker-hurdles, and other similar articles; and when peeled are used for making whisks for frothing up syllabubs, creams, and chocolate. In Poland, Russia, Sweden, Norway, and Lapland small bundles of the twigs, which have been gathered in summer, and dried with the leaves on, are used in the vapour-baths, by the bathers, for flagellating each other as productive of perspiration. The inhabitants of the Alps make torches of the branches. In Lapland and Kamtschatka the huts are constructed with birch branches covered with turf; and faggots of the spray with the leaves on, in cases formed of reindeer-skins, serve for seats during the day and for beds

at night. In the Highlands the branches are employed as fuel in the distillation of whiskey, being found to impart a flavour to it far superior to that produced by the use of fir-wood, coal or peat. Birch spray is also used for smoking hams and herrings and is preferred to other kind of fuel for a similar reason. It is likewise employed for thatching cottages and huts, and, when dried in summer with the leaves on, forms the bed of many a Highlander.

The leaves, catkins, and other green parts contribute in various ways to increase the utility of the birch. The leaves are rather bitter to the taste, but are willingly eaten by goats and rabbits, and although not usually regarded as food for cattle, they may be so employed when young and fresh, indeed they are dried for this purpose in Norway and Sweden. As a medicinal agent, it has been said that persons afflicted with rheumatism, by sleeping on a bed stuffed with birch-leaves experience a perspiration which affords them great relief. A yellow colour is obtained from them, which is used for painting in distemper, and for dyeing wool. The buds and the catkins afford a kind of wax analogous to that of bees. The Finlanders use the dried leaves as tea.

The bark is yet more valuable than the branches or leaves, and forms a material without which the inhabitants of the cold northern countries would be deprived of many of their slender comforts. This substance is remarkable for its durability, remaining uncorrupted for ages even in situations exposed alternately to air and water, cold and moisture and it is to this property that the bark owes much of its value. Gilpin relates a circumstance in illustration of this durability:—"When Maupertuis travelled through Lapland, to measure a degree of latitude, he was obliged to pass through vast forests consisting entirely of birch. The soil in some parts of these wastes being very shallow or very loose the trees had not a sufficient footing for their roots, and became an easy prey to wind. In these places Maupertuis found as many trees blown down as standing. He examined several of them, and was surprised to see that, in such as had lain long, the substance of the wood was entirely gone, but the bark remained, a hollow trunk, without any signs of decay. Another circumstance is worthy of note as exemplifying this preservative quality in the bark. In the mines of Dwoïetzkoi, in Siberia, a piece of birch-wood was found changed entirely into stone, while the epidermis of the bark of a satiny and glossy whiteness, was exactly in its natural state.

In some countries the bark of birch is used as coping to walls, and is placed over the masonry of vaults underground, as lead is in England, to prevent the moisture of the soil from penetrating through it, and it is for a similar reason wrapped round sills and the lower end of posts and other pieces of wood inserted in the ground, to preserve them from decay. The bark of large trees, cut into pieces measuring about three feet by two, serves the Laplanders as a kind of cape or cloak, a hole being made in it in the centre to admit the head: sometimes several pieces are used, with the holes only at one end, and these, put over the head, and hanging down on every side, form a protection from rains and snows more impenetrable than any English garment. The same people, and also the Russians convert the bark of the smaller trees into boots and shoes, the legs of the boots being taken from trees about the same thickness as a man's leg. The bark is also made into baskets, boxes, mats, cordage for harnessing horses and reindeer, and the inner bark into thread, while all the fragments are carefully preserved for lighting fires or twisting into candles. It is extensively used by the same people in roofing houses. The rafters are first covered with boards, on which plates of birch-bark are laid in the same way as slates are in England, and the whole is covered with turf and earth, to the depth of a foot or more, to exclude the heat in summer and the cold in winter. This exterior coating of earth is commonly covered with grass, and sometimes cultivated and Dr. Clarke mentions that on some of the roofs of the Norwegian cottages, after the hay was taken, he found lambs pasturing: on one house he saw an excellent crop of turnips. In Kamtschatka the inner bark is dried and ground, like that of the Scotch pine, in order to mix it with oatmeal to form an article of food in times of scarcity, and the same people eat the bark in small pieces along with the roe of fish. The bark is much employed for tanning leather, both in Britain and on the Continent. This employment of it in England seems to have been new in the time of Evelyn, for he speaks of 'Mr. Howard's new tan, made of the tops and loppings of birch.' The bark yields a yellowish brown dye converted to a brownish red by combination with alum, and the Russians obtain a similarly coloured dye for woollen stuffs and reindeer skins from a decoction of birch spray.

The ashes and the sap of the birch are in like manner brought into valuable use. As fuel, the birch ranks nearly on a level with the beech, the wood gives a clear, bright, and ardent flame and affords the kind of fuel most generally used in Sweden, Russia, and France in smelting furnaces. Its charcoal burns a long time and is much in demand for making gunpowder and for crayons. The ashes are rich in potash: one thousand pounds weight of the wood burnt green will give between ten and eleven pounds of ashes, which will afford about twenty ounces of potash. In the birch as in other trees, the potash is most abundant in the bark and consequently the small branches yield more in proportion than the trunk.

Vegetation of Western Australia.—One remarkable peculiarity of the vegetation of Australia is its harshness. The leaves of all the trees and shrubs are tough and rigid, frequently terminating in a thorn or very sharp point, and to the traveller in the Australian forest, who may have to push his way through them, they present a serious inconvenience and obstacle. If it were required to select from among the plants of Europe such as would be the types or representations of the botany of Australia the choice would probably fall upon the laurels, or laurestinas, as corresponding to the eucalypti, or gum trees, the firs (abies) as answering to the casuarinas, the yew to the Nuytsia floribunda, or cabbage tree, and the holly to the dryandras, and other species of the Banksia. The bulrush, the furze, and the sow-thistle are as common in New Holland as in England. The trees of Western Australia possess two remarkable features, the foliage, with few exceptions, is extremely thin, and the leaves present their edges to the sun, so that, although an expanse of forest land, interminable to the eye, will often extend on all sides of the traveller, it affords him but little shelter from the force of the sun's rays, and nothing of that cool and refreshing shade which is characteristic of sylvan scenery in Europe. The profound silence which prevails in these vast primeval forests is also very striking. It often happens that no sign of life in any shape will fall upon the ear, that nothing will be heard to sound or seen to move, neither the song of a bird, the buzz of a winged insect, the chirp of the lizard or grasshopper, nor the whisper of the wind disturbing for a moment the deep repose and almost unnatural loneliness of the untrodden scene. In the open country this solemn stillness is broken by a thousand tones, by the bounding of the agile kangaroo, the scream of the calyptorhynchus, or black cockatoo, or by the cry of the plyctolophus, or white cockatoo, a sound, which though not less dissonant, is more agreeable as the presence of the bird always indicates the neighbourhood of water. But in moving through the country during a calm summer's day, if an individual should stray behind his party, and gaze on them from an eminence as they proceed on their journey, the whole scene might remind him of the bright and noiseless representations of a camera obscura.—*Western Australia.*



CEDAR OF LEBANON

The cedar, the noblest of the cone-bearing trees, is
well calculated to excite admiration from its intrinsic
grandeur, while the associations connected with its
frequent mention in the Bible render it still more in-
teresting. To understand the feelings of the sacred
writers in reference to the cedar, we must recollect
that they lived in a country in which trees do not much
abound, and that their grateful shade would have been
most acceptable in the hot season. In passing over
barren sandy deserts and rugged mountain tracts the
shadow of the rock, rather than the shady grove, de-
fended the traveller from the noontide heat. Crossing
the naked ravines of Lebanon, he came to its "goodly
cedars" (already described in No. 551), and the repose
beneath their stateliness, bulk, and strength could not
but make a deep impression on any one capable of en-
joying the beauty of natural objects. Hence the fre-
quent reference to the cedars of Lebanon in the Bible.
We content ourselves with citing one of these passages,
in which Ezekiel compares the Assyrians to a mighty
cedar:—"Behold the Assyrian was a cedar in Lebanon,
with fair branches, and with a shadowing shroud, and
of an high stature; and his top was among the thick
boughs. His boughs were multiplied, and his branches
became long. The fir-trees were not like his boughs,
nor the chestnut-trees like his branches, nor any tree
in the garden of God like unto him in beauty." In
this description two of the chief peculiarities of the
cedar are mentioned. Few trees send out so many
branches from the main stem; and the tree which the
prophet had in his eye was one which had reached its
full growth and maturity: for when young the leading
stem shoots up singly, and does not throw out its
lateral shoots for some distance from the top; but as
it approaches its full growth, the elongation of the
main stem in reference to the parts beneath diminishes,
and the lateral branches increase in size and length
until its top is among the thick boughs. The graceful
sweep of its branches and the flat growth of the branch-
lets are very beautiful in the cedar. Its trunk is
massive and bulky in proportion to its height, giving
the idea of strength as well as beauty and elegance,
and the limbs are proportionally robust. No tree is
perhaps so well calculated to group with grand masses
of architecture. It is quite unsuited to situations which
do not correspond with its dignified appearance.

The introduction of the cedar into England is much
more recent than might have been anticipated; cer-
tainly not earlier than the latter half of the seventeenth
century. No credit is now attached to the tradition
that an old cedar at Enfield and one at Hendon, the
latter blown down many years ago, were planted by
Queen Elizabeth. Mr. Loudon ('Arboretum') con-
jectures that Evelyn was the first who planted the

cedar in Britain, and that the tree at Enfield was given by him to Dr. Uvedale, who resided there between 1665 and 1670. Evelyn praises the cedar in the 'Sylva,' and, writing in 1664, he terms it a "beautiful and stately tree, clad in perpetual verdure;" adding that "it grows even where the snow lies, as I am told, almost half the year; for so it does on the mountains of Libanus, from whence I have received cones and seeds of those few remaining trees. Why then should it not grow in old England? I know not, save for want of industry and trial." The introduction of the cedar has also been assigned to Sir Stephen Fox, an ancestor of the Holland family, who planted one at Farley, near Salisbury, besides several others in the gardens at Chelsea. The one at Farley was grubbed up in 1813, and the weight of the timber was found to be thirteen tons. In Scotland the cedar was first planted in 1740 by the Duke of Argyle, at Hopeton House, where three trees are still flourishing.

Although the cedar is a native of a southern country, yet in its proper habitat it is found growing at a great elevation, and exposed to a degree of cold which renders it hardy enough for a northern climate, and it is said to flourish even better in Scotland than in England. Sir T. Dick Lauder says that it "will succeed better in a wet mountain soil in a Highland wood than in the best garden in the country." Gravelly and sandy loams, near water, are very favourable to it, but in situations which are too dry the tree dwindles into a bush. When planted for ornamental purposes, it should enjoy ample space for the full growth of its branches, on the appearance of which much of its beauty depends. Instances are mentioned of the cedar having grown as rapidly as the Scotch pine, the larch, and the silver fir. Mr. Loudon mentions one which in forty years reached a height of fifty feet, the diameter of the bole being three feet six inches. The tallest cedar in England is said to be one at Strathfieldsaye, which is one hundred and seven feet high: and the largest, at Syon House, is seventy-two feet high; diameter of the trunk at three feet from the ground, eight feet, and that of the head one hundred and seventeen feet. The specimen in our cut is seventy feet in height, and its girth is thirteen feet four inches.

There are many allusions in ancient writers to the fragrance and incorruptible qualities of cedar-wood, but they refer not only to the Lebanon cedar, but to the wood of the juniper and cypress, which was also termed cedar. There can be no doubt of the valuable properties of the Lebanon species for timber, but hitherto the timber of the same tree grown in England is not equal in value to the larch, or, in fact, is rather inferior to it in appearance, besides being of a less durable quality. It resembles common deal; colour of a pale reddish white; texture soft and spongy; and the far-famed aroma scarcely exists. Mr. Selby, in his recent work on 'Forest Trees,' regrets that the useful qualities of the cedar have not been tested by a greater number of experiments in this country. He also shows that the extent to which it is capable of being acclimatized has not yet been proved; that is, the highest situation in which it will flourish in this country is not yet known. He is of opinion that "it would be found scarcely inferior, in hardihood of constitution, to the larch, and might be successfully cultivated, either in masses by itself or mixed with that tree, in those mountainous districts where the larch grows with the greatest vigour, and produces the finest timber." Mr. Selby introduces to notice a new species of cedar, a native of the Himalayas and the mountains of Nepaul, where it reaches a height surpassing that of the Lebanon cedar, "being usually one hundred and fifty feet at maturity, with a trunk thirty feet in circumference." The timber is reported to be of excellent quality, remarkably compact, fine and close in the grain, highly aromatic, very durable, of a deep rich colour, and capable of receiving a high polish. It is as ornamental as it is said to be useful, and will flourish in any part of Great Britain. Much remains yet to be done in introducing new species of forest-trees into this country. The owner of a large park could scarcely enter upon a more gratifying plan of embellishing his property than by collecting from all countries of parallel latitudes to Great Britain, and from the elevated mountains of hotter countries, all those trees which are to be prized either for ornament or use.

GLOVES AND GLOVERS.

The manufacture of gloves is one of those few which are so far removed from the class of factory operations as to afford employment to country-people and cottagers at their own homes, and from the nature of the work it is likely so to continue. Where no advantage is to be gained by a combination of different branches of labour, all tending to one end, beneath one roof, the less the freedom and independence of the labourer are interfered with, the better for all parties.

A slight examination of any of the usual kinds of gloves will show that whatever be the material of which they are formed, it is brought into shape by means of sewing with thread, silk, or worsted, but there may be some who have yet to learn that this is effected by the fingers, just as any other kind of needlework. Machinery has done much but it has not yet made gloves, or, at least, such a feat, if achieved, is one of the curiosities of manufactures, and is not yet to be ranked among the features of the glove-trade. So far as the mass of glove wearers are concerned, whether the gloves be 'French' or 'English,' whether they be of silk, or cotton, or worsted, or leather—whether they may have cost four pence or four shillings, every seam of every glove has been sewn by the hand.

There are some very curious circumstances attending the glove, independent of its relation to manufacturing industry. It has in various countries and at different periods been the pledge of friendship, of love, and of safety; the symbol of hatred and defiance, of degradation and honour, the token of loyalty; the tenure by which estates have been and are held; and a customary offering on occasions both of sorrow and of joy. From an interesting little volume on this subject by Mr. Hall, we will extract a few examples illustrative of these customs and observances of the glove.

The first law relating to this subject is dated in the year 790, when Charlemagne granted a right of hunting to the abbot and monks of Sithin, for the purpose of procuring skins for making gloves and girdles. The abbots and monks having generally adopted the use of gloves about this period, the bishops interfered, claiming the exclusive privilege for themselves; and by the Council of Aix, in the reign of Louis le Debonnaire, about the year 820, the inferior clergy were ordered to refrain from deer-skin gloves and to wear only those made of sheep-skin, as being of humbler quality. It has been deemed not improbable that at this period the monks made their own gloves, as they made many other articles for their own use.

So far as England is concerned, the first commercial notice of the glove-trade is dated about the year 1462, though gloves had been worn in England for centuries before. By a law or edict of this date, gloves were prohibited from being imported into this country by reason of the protection which it was deemed proper to give to this branch of home manufacture. Two years afterwards armorial bearings were granted to the glovers by Edward IV. At what prices gloves

were valued in that reign does not appear; but in the "Privy Expenses of Henry VIII" appear the following two items:—

'Item Paied the same daye to Jasson for certeyne gloves fetched by the serjeant apoticary . . . iijs. xd

Item Paied Jacson for a douzin and halfe of Spanysshe gloves . . . . vijs. vjd.'

In many of the customs relative to the glove, the *gauntlet* is often spoken of as being of equivalent meaning; but the two are sufficiently different. The gauntlet introduced into England by the Conqueror was a mailed glove; that is, a stout glove made of deer or sheep skin, having jointed plates of metal affixed to the back and fingers, allowing the perfect use of the hand; sometimes there was attached to the top of it a circular defensive plate, protecting the wrist and meeting the armour which covered the arm. The metal of which these plates were composed varied according to the rank or fancy of the wearer; some were of gold or silver inlaid, others of brass, and some of steel. The gauntlet or buff-glove of the days of the Commonwealth, such as we see in representations of the troopers of the seventeenth century, consisted of a sheep-skin glove, with a stout handsome buffalo hide top coming half-way up the arm, contributing much to a military appearance and serving as a protection to the arm. Such gauntlets are worn by several regiments of cavalry in our own day.

The ceremonial use of the glove in matters of investiture and tenure is illustrated in many ways. We may take, as an instance, the investment in the family of Dymocke of the manor of Scrivelsby, under the condition of the head of the family acting as 'champion' at the coronation of the English sovereign; in which the glove plays a conspicuous part in the ceremony. The sovereign being seated in Westminster Hall, after leaving the Abbey, the champion enters caparisoned as an ancient knight, and the herald-at-arms proclaims the challenge; the champion then throws down his gauntlet or glove, which is allowed to remain on the ground for a short time, and is then taken up again and returned to the champion; this is repeated a second time, after which the sovereign drinks to the champion's health, and presents him the cup; lastly, the champion takes up his gauntlet and retires. Taken in reference to modern taste and opinion, all this may seem to be mere mummery; but as a thing of other days it had a significant and important meaning in it. In like manner the Duke of Norfolk held the manor of Worksop on condition of paying certain small fees, and of finding the king a right-hand glove at his coronation, with which glove the king holds the sceptre with the dove, his right arm being supported meanwhile by the duke.

The glove has been deemed an emblem of firm possession. Thus the former kings of France used at their coronation to receive from the archbishop a pair of gloves, previously blessed, as an emblem of secure possession. A register of the parliament of Paris, dated 1294, states that "the Earl of Flanders, by the delivery of a glove into the king's hands (Philip the Fair), gave him possession of the good towns of Flanders, *viz.* Bruges, Ghent, &c." Favyn states that "the custom of throwing the glove is derived from Eastern nations, who, in all sales or delivery of lands, &c., gave a glove by way of livery or investiture." Security, as emblemed by the glove, was curiously illustrated by a custom prevailing until the last few years at Portsmouth, where, during an annual fair called the 'Free-Mart,' a golden or gilt glove was hung outside the door of the gaol, in the High Street, as a pledge that the persons of all who attended the fair were secure from arrest from debt during its continuance, which was about a fortnight.

Both honour and degradation have been typified by the glove, according to the circumstances attending the particular occurrence. Walsingham says that "George Clifford, Earl of Cumberland, was honoured by a glove being presented to him by Queen Elizabeth. The Queen had dropped it, when the Earl taking it up to return it to her, the Queen presented it to him as a mark of her high esteem. The Earl adorned it with jewels, and wore it in his cap on days of tournament." On the other hand, the same writer tells us, that when the Earl of Carlisle, in the reign of Edward II., was impeached, and condemned to die as a traitor, among other circumstances attending his degradation were, that his spurs were cut off with a hatchet, and his *gloves were taken off*.

Challenge and defiance have been, in various ages and countries, conveyed by the glove. Besides the instance given in reference to the 'Champion' of England, we have abundant evidence of such challenges. Shakspere, in 'Henry V.' gives a scene which well represents the nature of the custom, wherein the glove may be deemed either a pledge or a challenge, or part of both:—

K. Henry. 'Give me any gage of thine, and I will wear it in my bonnet: Then, if ever thou darest acknowledge it thine, I will make it my quarrel.

Williams. Here's my glove: give me another of thine.

K. Henry. There.

Williams. This will I also wear in my cap: if ever thou come to me and say after to-morrow, This is my glove, by this hand I will take thee a box on the ear.

K. Henry. If ever I live to see thee, I will challenge thee.'

Sir Walter Scott's description of the interview between Rebecca and Beaumanoir, in 'Ivanhoe,' gives an instance illustrative of a very usual kind of challenge by champion-depute, while the scene with Bonthron in the church, in the 'Fair Maid of Perth,' similarly illustrates a formal act of defiance—the glove in both cases being the emblem. In the 'Life of the Rev. Bernard Gilpin,' it is said, in reference to the northern borderers of the sixteenth century—'He observed a glove hanging up high in the church in which he was preaching, which was placed there in consequence of a deadly feud prevailing in the district, and which the owner had hung up in defiance, daring any one to mortal combat who took it down.' In the ancient 'Trial by Battle,' the plaintiff was wont to throw down his glove in court, which was then taken up by the defendant, as a token that they would settle their differences by the sword's point. A defiance by glove was made in the Court of King's Bench so late as 1818, and it was not till after that period that the law by which it was permitted was expunged from the statute-book.

How swearing "by the glove" could have arisen is not very clearly to be seen, unless the glove be here, as in other cases, deemed an emblem of honour and probity. The reader will call to mind many scattered illustrations, somewhat similar to the following from the 'Merry Wives of Windsor':—

"*Falstaff.* Pistol, did you pick Master Slender's purse?

Slender. Ay, *by these gloves* did he—*by these gloves*.

Pistol. Word of denial—froth and scum—thou lyest!

Slender. *By these gloves*, twas he."

The presentation of gloves at weddings and at funerals is another curious item in the catalogue. A passage in the 'Winter's Tale' shows that the gift of gloves at weddings was common in Shakspere's time; and the same custom is alluded to in Ben Jonson's 'Silent Woman,' where Lady Haughty says to Morose:—

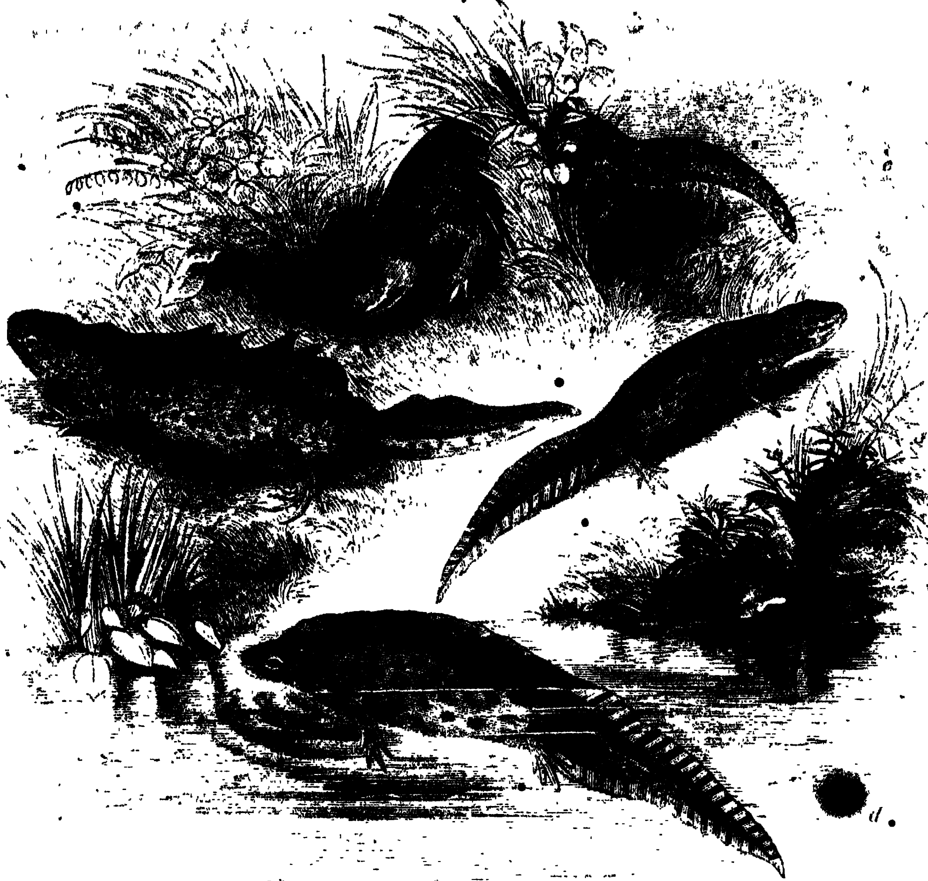
"We see no ensigns of a wedding here,
No character of a bridale:
Where be our scarves and gloves?"

As to funerals, the practice of giving gloves at those solemnities has been traced back to early times. Pope Leo I granted permission to bishops and abbots to wear gloves at funerals and on certain other solemn occasions. Royal and other noble personages were often buried with gloves on; for on opening the tombs of kings and abbots, gloves have frequently been found either on the hands or loose in the coffins, and it was stated, as an unusual circumstance, that when the tomb of King Edward I was opened, *no gloves* were found on his hands. In Philip I's monument, he is represented in a recumbent position, holding a glove in his hand; and many other cases are recorded, in which gloves are either buried with a royal or military personage, or hung up in effigy over his tomb.

The presentation of gloves as a gift, with or without money inserted in them, is another custom which has passed through many gradations of society. James I, when at Woodstock, received a pair of gloves as a gift from the University of Oxford. The same monarch used to receive New Year's Gifts from his subjects, generally consisting of elegant gloves; and so likewise did his predecessor, Elizabeth. There was formerly a custom of presenting judges with gloves, but this became an abuse, in a way which the following anecdote will illustrate:—A lady, a suitor in Chancery, whose cause had been favourably decided by Sir T. More, presented him, on the next New Year's Day, with a pair of gloves containing a considerable sum of money. His remark was, "I accept the gloves; it would be against all good manners to refuse a lady's New Year's Gift, but the lining you will be pleased to bestow elsewhere."

Whaling off New Zealand.—The whale-boats are admirably adapted for the purpose for which they are intended. They are of various construction, and are designated as English, French, or American; each has some peculiarity to recommend it. They are capable of resisting the rough sea of Cook's Straits, but are at the same time swift and buoyant. When starting on a whaling expedition, the boats leave Te-awa-iti before the dawn of the morning. Each has either five or six oars, and a crew accordingly. The boat-steerer and headsman are the principal men in the boat, and are generally Europeans; the rest are natives. They pull to the entrance of Tory Channel, where a view opens over Cook's Straits and Cloudy Bay from the southern headland, where they keep a "look-out" for the spouting of a whale. The boat which kills the calf claims the cow, even though it should have been killed by another boat's crew. If a whale has been killed, the different boats assist each other in towing it to Te-awa-iti. I once saw ten or twelve boats towing in a whale. Each boat had a little flag, and the whole scene was gay and animated. One day a calf had been killed, and the cow, having been fastened upon, but not despatched, was towed inside the channel. Gasping in the agonies of death, the tortured animal, when close to our ship, threw up jets of blood, which dyed the sea all around, and, beating about with its tail, it broke a boat right in the middle, and threw the crew into the water; but it at length died, exhausted from the many wounds which the irons and harpoons had inflicted. The calf was stated by the whalers to be six weeks old (on what grounds I do not know), and was twenty-four feet long. It was cut up in a few minutes, and gave several barrels of oil. The process was so rapid, that when I came ashore I found only the head. I cut out the brains, the weight of which, amounting to five pounds and one ounce, astonished me greatly. The whalebone was very soft, and therefore useless. There were two hundred plates of it on each side of the roof of the upper jaw. I got the whole roof cut off, and, intending to dry and preserve it, I placed it on the roof of a native house; but on the following morning I had the mortification to find that the rats and native dogs had found their way to it in the night, and had eaten all the softer parts, so that the rest fell to pieces. A portion of the heart of this calf was roasted and sent to our table. In taste I found it very like beef, but it was darker in colour. The cow was sixty feet long, and measured between the fins on the belly eighty-two inches. Her skin was a velvet-like black, with the exception of a milk-white spot round the navel. As regards the colour of the whale, I have been repeatedly assured that it is sometimes speckled, and that even perfect albinos, or cream-coloured ones, are seen, which must indeed be beautiful animals. The fat or blubber of this whale was nine inches thick, and yielded eight tuns and a half of oil. Whales have been known to yield twelve or thirteen tuns; but I have been told that so large a quantity is now very rarely obtained, from the great decrease of the whales. A whale which yields nine tuns is at present regarded as a very good one. The tongue was of a white or ash colour, blackish towards the root. This organ gave several barrels of oil, and is a monopoly of the "tonguer," or "cutter-in." The latter operation is performed at Te-awa-iti near the shores, where, by means of a windlass, the whale is raised to the surface of the water under a scaffold called the "shears." The blubber is cut off in square pieces by means of a sharp spade; it is then carried to the shore, and immediately put into the trying-pots. The "cutting-up" of a whale, *secundum artem*, is a process which requires great proficiency, like that of the skilful dissector, who separates the cutis, and with it at once all fat and cellular tissue from the subjacent muscles. In the whale the blubber is to be regarded as the cutis, in the cellular structure of which the oily matter has been deposited. Shortly after the death of the fish the epidermis comes off in large pieces looking like oiled and dried satin.—*Dieffenbach's Travels in New Zealand.*

Food of Natives of Australia.—Generally speaking, the natives live well; in some districts there may at particular seasons of the year be a deficiency of food, but if such is the case, these tracts are at those times deserted. It is however, utterly impossible for a traveller or even for a strange native to judge whether a district affords an abundance of food or the contrary; for in traversing extensive parts of Australia, I have found the sorts of food vary from latitude to latitude, so that the vegetable productions used by the aborigines in one are totally different to those in another; if therefore, a stranger has no one to point out to him the vegetable productions the soil beneath his feet may teem with food, whilst he starves. The same rule holds good with regard to animal productions; for example, in the southern parts of the continent the Xanthorea affords an inexhaustible supply of fragrant grubs, which an epicure would delight in, when once he has so far conquered his prejudices as to taste them; whilst in proceeding to the northward, these trees decline in health and growth, until about the parallel of Gantheaume Bay they totally disappear, and even a native finds himself cut off from his ordinary supplies of insects, the same circumstances taking place with regard to the roots and other kinds of food at the same time; the traveller necessarily finds himself reduced to cruel extremities. A native from the plains taken into an elevated mountainous district near his own country, for the first time, is equally at fault. But in his own district a native is very differently situated; he knows exactly what it produces, the proper time at which the several articles are in season, and the readiest means of procuring them. According to these circumstances he regulates his visits to the different portions of his hunting ground; and I can only state that I have always found the greatest abundance in their huts. There are, however, two periods of the year when they are at times subjected to the pangs of hunger; these are in the hottest time of summer, and in the height of the rainy season. At the former period the heat renders them so excessively indolent, that until forced by want they will not move; and at the latter, they suffer so severely from the cold and rain, that I have known them remain for two successive days at their huts without quitting the fire; and even when they do quit it, they always carry a fire-stick with them, which greatly embarrasses their movements. In all ordinary seasons, however, they can obtain in two or three hours a sufficient supply of food for the day; but their usual custom is to roam indolently from spot to spot, lazily collecting it as they wander along.—*Captain Grey's Journals.*



[*a*, Common Water-Newt—Triton cristatus. *b*, Common Smooth Newt—Lissotriton punctatus. *c*, Straight-lipped Water-Newt—Triton Bibronii. *d*, Palmated Smooth Newt—Lissotriton palmipes.]

THE WATER-NEWT, OR EFT.

In some minds the creeping things of land or water produce feelings of disgust—or rather, many persons assume feelings of disgust at the sight of such creatures. Others (we hope they are but few) look with indifference upon all natural objects, unless such as immediately minister to their comfort, convenience, or vanity: they wonder at, perhaps despise, the man who stops on his walk to examine the web of the spider, the nest of the bird, or the underground galleries of the mole. The rapid actions of the full-eyed squirrel as he darts up the tall stem of the beech, the turmoil and bustle of the rookery, the cloudy flight of congregated starlings—all sights and sounds which to the lover of nature are of interest, they do not regard—they have no pleasure therein: much less then would such creatures as the water-newt attract their notice; creatures to which popular ignorance has attributed the most noxious properties, and which have nothing in their aspect or in the brilliancy of their colouring to recommend them. Yet, in truth, the history of the water-newt is far from being uninteresting: it has indeed engaged the attention of some of the most philosophic investigators of nature, and involves some points of physiological importance. Of the Water-Newts (*Triton*, Laurenti; *Salamandra*, Ray), four species inhabit the ponds, ditches, and clear sluggish or standing waters of our island; of these the largest is the Great Water-Newt (*Triton cristatus*), which is common in the neighbourhood of London, and may be readily obtained or observed in months of spring and summer. The water-newts, lizard-like as they are in appearance, must not be confounded with the Lacertine group, with which Linnæus, overlooking their true characteristics, associated them, under the common generic title of *Lacerta*. All the true lizards have the skin covered with scales, and undergo no transformation after exclusion from the egg. The water-newts are, in fact, like the frog, amphibia, and belong to that section (*Caducibranchiate*) in which the gills, or branchiæ, with which the animals are at first furnished for aquatic respiration, become ultimately lost, and are replaced by true lungs adapted for a different medium. On its first exclusion from the egg, the minute tadpole of the newt has much the appearance of the tadpole of the frog; on the sides of the neck are to be seen the lobes of the branchiæ in a simple state, the anterior pair serving the purpose of holders, by which the animal attaches itself to objects in the water. In about three weeks on the average the anterior limbs have gained terminal and distinct feet, the branchial tufts have acquired a fringed character, the eyes have assumed a definite outline, and the holders have disappeared. The little creature now moves rapidly about, propelling itself through the water by the undulatory movements of its laterally-flattened tail. In a short time after this, the anterior limbs become more perfect, and the toes, four in number, are fully developed, the hind-limbs begin to sprout, and the branchial tufts, three on each side, are much enlarged and finely plumed. In a short time the hind limbs, and feet with five toes, are completely formed, the body has attained its nearly perfect figure, and the branchiæ have assumed a deeper colour and

firmer texture. The lungs are now rapidly developing, a change in the routine of the circulation is gradually taking place, the branchiæ are becoming absorbed, towards the middle or close of autumn they disappear, and air, instead of water, becomes the medium of respiration. In the branchiæ of the tadpole of the newt, when the fore-limbs are beginning to sprout, or have made some progress, the circulation of the blood when viewed through a good microscope is calculated to excite the greatest admiration. Their transparency is such as to permit the currents of globules rapidly coursing each other to be distinctly seen as they ascend the arteries and return by the veins to the aorta. A similar transformation takes place in the tadpole of the frog, with this addition, that the compressed tail shrinks as the branchiæ are in progress of obliteration, and is at last absorbed. In the tadpole condition of these animals the circulation of the blood resembles that of fishes. The heart consists of one auricle and one ventricle. The auricle receives the blood of the general system, and immediately transmits it to the ventricle, which is muscular; from this ventricle it is propelled through a system of branchial arteries, where it becomes decarbonized by the action of oxygen; from these arteries it passes into the branchial veins, which ultimately unite to form an aorta, without the intervention of a second ventricle. When the branchiæ are lost, the heart and circulation have assumed new characters; the heart then consists of a ventricle and two auricles, and by wonderful modifications the branchial becomes transformed into a pulmonic circulation. The right auricle receives the blood returned from the system, the left auricle the freshly oxygenated blood returned from the lungs; both these auricles transmit their contents into the ventricle, which thus receives exhausted and also re-arterialized blood, the two fluids becoming more or less mixed together. Part of this mixed fluid is sent through the aorta to the system, part through the pulmonary arteries to undergo a still further degree of oxygenation in the lungs.

The Great Water-Newt (*Triton cristatus*) attains to the length of more than six inches; and is one of the most aquatic of its genus, residing almost constantly in the water: we have, however, several times captured it in meadows, especially in Cheshire (where it is termed Asker), at the latter part of the summer. Its bright orange-coloured abdomen with distinct round spots of black, together with its size, prevent the possibility of confounding it with any other species, except perhaps the Triton palmipes, of which the under surface is saffron-yellow or, as Latreille states white without spots. The great water-newt is active and voracious: it feeds during the spring and summer on the tadpole of the frog, and also upon the smaller species of newt, which it attacks and seizes with the utmost determination; it will also prey upon worms and insects, and may be taken by means of a hook baited with a small worm. It swims vigorously, lashing its compressed tail from side to side, the limbs being so disposed as to offer no resistance to the water: we have seen it, however, crawl slowly at the bottom of the water, as well as on land, where its movements are inert; its small feeble limbs are indeed ineffectual organs of locomotion. In this respect it differs very greatly from the common lizard (*Zootoca vivipara*), the actions of which are exceedingly prompt and rapid; but the scale-clad lizard uses not only its limbs, but its whole body and tail in a serpent-like manner in progression, and appears to glide through the tangled herbage. The newt, like the frog, hybernates: generally it lies in a torpid state during the winter in the mud at the bottom of ponds and ditches. Mr. Bell, however, states that he has found it hybernating under stones, and we ourselves on one occasion, early in the spring, saw several creeping out from under some large flags placed to support a bank by a road-side not far from the river Bollen in Cheshire. On taking up one by the tail, as we well remember, the tail to our dismay broke short off, and continued for some time to be rapidly agitated. The same we have seen take place when the common lizard has been seized in a similar manner. In the newt the tail is re-produced after such an accident, and, we believe, also in the lizard: this is certainly the case in the Geckos.

On awaking from its lethargy in the spring, the male begins to assume a membranous dorsal and caudal crest, by which he is at once distinguished from the female. The dorsal crest, which extends along the whole length of the back down the spine, has its edge indented; but that along the tail has the edge even: with the completion of this crest the colours become brighter and more decided, and the animal is more lively and vigorous. At the latter end of April, and during the months of May and June, the female deposits her eggs, not, as in the case of the frog, in multitudes all agglutinated together in a gelatinous medium, but one by one, each in a distinct spot from the other. Resting on the leaf of some aquatic plant, she folds it by means of her two hinder feet, and in the duplication of the leaf thus made she deposits a single egg, gluing at the same time the folded parts together, thus concealing and protecting the enclosed deposit. This process was first described by Rusconi, and has since been minutely detailed by Mr. Bell, who has often observed the process. It is in this manner that egg after egg, at various intervals, is secured each in a separate leaf. Soon after their deposition, changes in the eggs begin to show themselves, with an according development of the embryo, till its exclusion, when it passes gradually through the transmutations already detailed, till it acquires its permanent condition.

The membranous dorsal crest of the male continues till the autumn, when it is gradually absorbed, and quite lost during the period of hybernation; that of the tail is also greatly reduced, but not entirely, a trace of it still remaining.

In this species the upper lip is slightly pendulous; the teeth are numerous and minute; the head flattened, the body round, corrugated, and covered with minute tubercles. There are two patches of simple pores on each side of the head, and a line of similar pores running at distant intervals down each side. The upper parts of the body are dusky-black or yellowish-brown with darker round spots, the under parts orange with round spots of black; the sides are dotted with white; the sides of the tail are to a greater or lesser extent of a silvery-white.

The common Smooth Newt (*Lissotriton punctatus*, Bell) differs considerably from the Great Water-Newt in its habits. It is much more terrestrial, frequenting damp places, and is often found in cellars and underground vaults. Shaw indeed, in his 'General Zoology,' asserts that the common newt is altogether a terrestrial species, and contradicts the statement of Linnæus, that during its larva or tadpole condition it inhabits the water.

He says, "I can safely affirm that I have more than once met with specimens in perfectly dry situations, so extremely minute as scarcely to equal half an inch in length, which appeared to differ in no respect except in magnitude from the full-grown animal." We have seen the same in damp cellars in abundance; and we believe them to be the young just emerged from their tadpole state, at which period numbers leave the water and visit the land, where they crawl about in search of a congenial shelter. This fact was observed by J. Ellis, F.R.S., who asserts, in a letter to the Royal

Society dated June 5, 1766, that the Water-Eft, or Newt, is only the larva of the Land-Eft, as tadpoles are of frogs. Rusconi has amply confirmed Ellis's statement, and other naturalists, among whom we especially mention Mr. Bell, have watched the progress of the newt from the egg to maturity, noting every stage of the transformation.

It is true, however, that these young newts are seen in places into which it is difficult to conceive how they could have gained access: one cellar in particular we could point out, in which these little creatures were common, but which was remote from any clear ditch or pond in which they could have been bred and yet they were too small and feeble to have travelled far; to say nothing of the impediments of high walls, &c. in the way of their migration. They were pallid, slow in their motions, and destitute of all trace of branchiæ. A circumstance relative to the frog involved in a similar difficulty came under our personal observation. We know indeed that young frogs migrate, and appear suddenly in great numbers in fields, lanes, &c., as if they had sprung at once into being; but the instance in point cannot be reconciled with this kind of migration. The fact is as follows:—Our garden is enclosed with a high wall, an alluvial soil rests upon a thin layer of clay, superimposed upon a bed of sandy gravel, below which is the ordinary layer of London clay. The gravel, when bored, yields water, and wells are sunk in it. Now in this garden—so placed that no frog, unless it could leap many feet high or burrow like a mole, could, as it would seem, enter—in the summer of 1841 two large colonies of young frogs made their sudden appearance: they had just emerged from their tadpole state, and they occupied different spots. One colony consisted of light coloured, the other of very dusky individuals, and this difference they preserved as they grew, to the close of autumn. They hybernated in the mould along the sides of the wall, under flowerpots and tufted vegetables, and re-appeared in the following spring. They still continue in the garden, though their numbers appeared thinned at the close of last autumn. No fresh colony, however, made its appearance in the summer of 1842. The question is where could these young frogs, just out of the tadpole state, have come from. A gentleman well known in the scientific world, to whom we related the fact, and who examined the premises, agreed that they could not have gained admittance in the ordinary way. We can scarcely suppose that they burrowed under the wall. Might not the eggs have descended from rivulets and flooded drainage-courses to the ground-springs of the gravel bed, and there in cavities or fissures filled with water have become hatched, the tadpoles undergoing their change, and feeding on insects brought down by the same means, worms, &c., and then have subsequently made their way through crevices in the earth till they gained the surface. Now in the cellar referred to, into which the ground-spring often rose, might not something similar occur in the case also of the newts?

To return from this digression. The common or smooth water-newt is found in all clear ponds and ditches or drainages; in the spring the males appear ornamented with a continuous membranous crest from the head down the back to the end of the tail. This crest they lose in the month of June or July, when both adults and young quit the water for the land, where they creep about, lodging in damp places, among the roots of trees, under stones, in crevices of the ground, &c. Early in the winter the crest of the male re-appears, and is complete in the beginning of the spring, at which period he assumes a richer colouring. Aquatic insects and their larvæ, worms, and the tadpoles of the frog, constitute the food of this species, which in turn falls a prey to fishes and to the great water-newt. The female deposits her eggs much in the same manner as already described, generally within a folded leaf, but not unfrequently at the junction of the leaf with the stalk. Mr. Bell states he has sometimes seen the females in the act of placing eggs not only singly, but by two, three, and four together.

The growth of the young is rapid, and they arrive nearly at their full size during the course of the first summer and autumn; but it would appear that the transformations are not concluded in the same space of time by all; for specimens are sometimes found which have not lost the branchiæ, and yet are far larger than other individuals in which the transformation is completed. Temperature, food, locality, and other circumstances may influence the slowness or rapidity of the change.

In this species, as proved by Spallanzani, not only the tail, but also portions of the limbs may be removed, the lost parts being in due time reproduced, bones, muscles, nerves, blood-vessels, and all: nor this only once, but several times in succession. So tenacious, in fact, is the newt, that it has been frozen in a solid mass of ice, and survived the ordeal if the thawing process was slow. Yet tenacious of life as this and the other species certainly are, they die in the most violent convulsions when sprinkled with salt, and evidently suffer extreme agony. No one, we trust, will be so inhuman as to try the experiment.

In the common newt the skin is smooth; on the head there are two rows of pores; the crest of the male is not only much developed in the spring, but its margin is crenate, the tips of the crenations being often tinged with fine red, sometimes violet. The general colour is yellowish or brownish grey above, bright orange below, and everywhere marked with dark spots, some rounded, some of an irregular figure. The female is yellowish-brown with scattered spots, and without the rich orange of the under surface. The upper lip is quite straight. This species is three and a half or nearly four inches in total length.

Of the two other British species, one is the Straight-lipped Warty Newt (*Triton Bibronii*, Bell) and the Palmated Newt (*Lissotriton palmipes*, Bell). The former (*T. Bibronii*) differs from the Great Water-Newt (*T. cristatus*) in having the upper lip perfectly straight, and not overhanging the lower at its sides. The skin also is more rugous and strongly tuberculated, and the general colour is darker. M. Bibron first detected the existence of this species in England, and pointed out the differences between it and the Great Water-Newt, with which it had always been confounded; at the same time he regarded it as the *T. marmoratus* of Latreille, common on the Continent. Mr. Bell, however, thinks it distinct, and consequently new to science. His opinion is founded on a close comparison of several individuals with specimens of Latreille's *T. marmoratus*, sent from Paris by M. Bibron for his examination. Its manners and habits are precisely those of the great water-newt, and it is perhaps equally abundant.

The Palmated Water-Newt is also a common species, but has been by most naturalists confounded with the common species, from which it differs in having the upper lip pendulous at the sides and the five toes of the hind-feet fringed permanently with a short membrane. It is also of larger size, and the spots which cover the body both above and below are more numerous and smaller, and their outline is more distinctly defined; the head also is elegantly marked with brown longitudinal lines. Like the common species, however, it is liable to some variation of markings.



[The Bheels.]

THE TRIBES OF INDIA.

The Bheels are the aboriginal inhabitants of the western parts of India: at some remote period, beyond the reach of historical records, they were driven from the plains, and now inhabit the wild tract of country which separates Malwa from Nemaur and Guzerat. According to the traditions of their conquerors, the Bheels were the founders of many of the cities and towns of Central India. The history of such a people is always impressive, often mournful, and almost every part of the world has presented instances of similar vicissitudes of the human race produced by brute force and the power of numbers over right and justice. Sometimes the extermination of races has been a just punishment for their vices and wickedness; but when they have nobly struggled for independence, it is impossible to regard their fate without sympathy. Generally a remnant of the vanquished has found refuge in the fastnesses of the mountains, where for ages afterwards may be traced a language, manners, and usages long since obliterated in the more accessible parts of the country. These characteristics of national life are preserved amid the seclusion of mountain districts, and are often found after the plains have been the scene of many successive changes. The Bheels are quite a distinct race from any other in India, though their manners are described as resembling the Puharrees, another or perhaps the same aboriginal race, inhabiting the eastern parts of India, and whose fate has been similar. Bishop Heber describes them as "less broad-shouldered and with faces less Keltic than the Puharrees," who, he says, very much resemble the Welsh. While the history of the Bheels naturally excites curiosity, their dispersion over rugged tracts of country, and their ignorance and prejudices, are obstacles to intercourse; and little is known concerning their habits, customs, and forms of worship, except that they are different from those of other races of India. The word 'Bheel,' which signifies a robber or plunderer, is applied generally to the people who dwell in the mountains of Central India and amidst the thickets on the banks of rivers; but used comprehensively in this manner, it includes many who are not real Bheels, though they have adopted their predatory habits.

Sir John Malcolm divides the Bheels into three classes:—those who live in villages, the agricultural Bheels, and the wild Bheels of the hills. "The first," he says, "consist of a few who, from ancient residence or chance, have become inhabitants of villages on the plain (though near the hills), of which they are the watchmen, and are incorporated as a portion of the community. The cultivating Bheels are those who have continued in their peaceable occupations after their leaders were destroyed or driven by invaders to become desperate freebooters; and the wild or mountain Bheel comprises all that part of the tribe, who, preferring savage freedom and indolence to submission and industry, have continued to subsist by plunder." It is interesting to remark that in proportion as surrounding governments were well ordered and strong enough to protect the country, numbers of the mountain Bheels were accustomed to abandon their predatory habits and join their more peaceful brethren; but the weakness and disorganization of the supreme power was again the signal for them to resume their wild life, and once more the terror which they inspired added to the confusion and disorder of society.

The wild Bheels, according to Sir John Malcolm, are a diminutive, ill-fed, and wretched-looking people though, he says, they are active and capable of great fatigue. They are much addicted to excesses in spirituous liquors, and frequently assemble for drinking bouts, which generally end in quarrels. The village Bheels are faithful and honest, and those who live by cultivation are industrious, but rude in their manners, easily assimilating to their wilder brethren. Heber, who writes several years later, speaking of the Bheels, says, "Thieves and savages as they are, the officers with whom I conversed thought them on the whole a better race than their conquerors. Their word is more to be depended on; they are of a franker and livelier character; their women are far better treated and enjoy more influence; and though the Bheels shed blood without scruple in cases of deadly feud or in the regular way of a foray, they are not vindictive or inhospitable under other circumstances." When Sir John Malcolm exerted himself to reform the habits of the Bheels, he found his efforts heartily seconded by the women, whose interests indeed are everywhere improved by whatever diminishes crime, and substitutes industry and steady habits for a life of violence and plunder. The rude religion of the Bheels bears some resemblance to that of the Hindoos, but they excite the horror of the latter by eating the flesh of the cow. Their ceremonies are chiefly propitiatory, consisting of offerings to the minor infernal deities of the Hindoo mythology.

Bishop Heber describes a Bheel village. "The huts," he says, "were all of the rudest description, of [illegible] wattled with long grass, and a thatch of the same, with boughs laid over it to keep it from being blown away. They were crowded close together as if for mutual protection, but with a small thatched [illegible] adjoining for their cattle. Their fields were also neatly fenced in with boughs, a practice not common in India, but probably necessary here to keep off the deer and antelopes from their corn." In another part of the country he found some Bheel huts neater and better constructed than the above. "Each was built of bamboos wattled so as to resemble a basket; they had roofs with very projecting eaves thatched with grass, and very neatly lined with the large leaves of the teak tree. The upper part of each gable end was open for the smoke to pass out. The door was wattled and fastened with a bamboo plait and hinges, exactly like the lid of a basket, and the building was inclosed with a fence of tall bamboo poles, stuck about an inch apart, connected with cross pieces of the same, and with several plants of the everlasting pea trained over it. Within this fence was a small stage elevated on four poles about seven feet from the ground and covered with a low thatched roof." This stage served either as a sleeping-place for the sake of coolness or protection from wild beasts, or, as it stood in the centre of a patch of Indian corn, it might be intended as a post to watch the crop from.

Under our Indian administration, the districts in which the Bheels were accustomed to make their forays now enjoy a security for life and property which is gradually becoming more complete. Many of them are received into our service as soldiers, and those who have not given up their robber habits have little hope of reviving the former extensive and organized predatory system. When Bishop Heber travelled in these parts of the country in 1825 he was told that "five years ago a thousand men could hardly have forced their way through these jungles and their inhabitants," but then he was safe with sixty. The Bheels, however, still plundered smaller parties. Their chiefs have no longer the chance of seizing the riches of a wealthy province, and by their successes and genius fixing themselves on thrones. The power of the Bheel principalities, which was very similar to that exercised by a Highland chief over the clan, had been declining before British authority was extended to Central India, and from its nature it must at all times have depended upon the successes and talent of the chief. Sir John Malcolm says:—"The rights of the different tribes or families of which the force of the principal chiefs is formed are defended by an hereditary Turwee, or head, to whom they owe obedience, and who, though he may become the subject of a principal chief, maintains an independence proportionate to the strength of his followers. The military force of a chief would usually consist of several hundred men, but his ranks would increase in proportion to his success. The revenue consisted for the most part of plunder, and the government was of the rudest character, administered not by the Turwees or heads of families, but by officers appointed by the chief. The Dewan kept the few records which were necessary. A collector gathered the dues from hamlets, received cattle that were stolen, and distributed them according to established usage. The Havildar, or commander of the horse, took charge of cattle at the time they were plundered, and delivered them to the collector. The head executioner always attended the chief. The duty of watching the roads and giving information respecting unprotected villages and travellers was an office of [illegible] importance."

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GLOVES AND GLOVERS.

(Continued.)

Mr. Hull, in his 'History of the Glove Trade,' states that Scotland was the first country in which the glovers were incorporated. King Robert III gave the glovers of Perth a charter so long back as the year 1400; the gloves made at that time being chiefly buck and doe skin. Scotland has not maintained the position which this priority would seem to indicate; for, with the exception of a few at Dunkeld and Montrose, there are hardly any gloves now made in that country.

In London the glovers were incorporated by Charles I in 1638, although they had ancient [illegible] so long back as the year 1464. In the time of Charles I the glovers of London carried on an important trade, and it was partly to remove certain abuses which had gradually crept into the occupation that the charter was given. The preamble, after stating that a petition had been received from the glovers of the metropolis, proceeds in the following curious strain:—"We have been informed that their families are about four hundred in number, and upon them depending above three thousand of our subjects, who are much decayed and impoverished by reason of the great confluence of persons of the same art, trade, or mystery into our said cities of London and Westminster, from all parts of our kingdom of England and dominion of Wales, that, for the most part, have scarcely served any time thereunto, working of gloves in chambers and corners, and taking apprentices under them, many in number, as well women as men, that become burdensome to the parishes wherein they inhabit, and are a disordered multitude, living without proper government, and making *naughty and deceitful gloves*." It is then stated that the reputation of English glovers had been injured abroad by these "interlopers," and finally the London company is endowed with the enormous power "to search for and destroy bad or defective skins, leather, or gloves."

Deer and sheep skin gloves were the kind principally

made in London in Charles's time; but after the introduction of kid gloves into England, the London makers took up that branch, and have maintained eminence in it to the present day. It was estimated, eight or ten years ago, that there were about sixteen hundred glove-makers, men and women, in London, who made fifty thousand dozen pairs annually.

The City of Worcester has gained great reputation for its gloves. This branch of manufacture is known to have existed there for two hundred and seventy years; and the glovers of the city were incorporated in 1661. Beaver-gloves (made of leather dressed with oil) used to be made here; but when these began to get nearly out of fashion, the manufacturers took up the manufacture of 'tawed' or alumed leather-gloves (of which kid is an example) in greater quantities than before. A few years ago the produce of Worcester and its vicinity was estimated at so large a quantity as nearly half a million dozen pairs annually, the value of which was nearly four hundred thousand pounds.

The glove trade of Worcester, in its general arrangements, is very interesting. The master-manufacturers were estimated in 1832 at a hundred and twenty; and the operatives, including men, women, and children, at thirty thousand. But it must not be supposed that this large number inhabit the city of Worcester: there are, on the contrary, only a small number of glove-makers within the city; the bulk of them being scattered throughout the villages lying ten or a dozen miles on every side of it. The sewing of a pair of gloves requires so little preparation or arrangement, that an humble cottager can carry on the occupation in her own poor dwelling; while her husband, and perhaps her children, are at work in the fields or the farm-yard.

If we trace a pair of Worcester kid-gloves through their progress of manufacture, we shall see the details of the system followed. In the first place the leather, whether it be real kid, or 'imitation kid' made of lamb's-skin, is generally prepared in London, by some one of the many leather-dressers of Bermondsey; or, in some cases, the skins undergo the earlier processes of dressing in Bermondsey, and are then dyed, softened, and brought to a finished state by the master-manufacturer at Worcester. Many of the Bermondsey leather-dressers have agents in Worcester, to transact the dealings with the master glovers. The dressed skins are cut out in the workshop of the master, generally by means of large shears: the workman shaping the various pieces partly by guides and partly by the accuracy of his eye and hand. The thumb-pieces, the pieces to form the sides of the fingers, &c., all of which have certain technical names, are cut out with much rapidity, and bound up in small parcels, each parcel containing the necessary pieces for a dozen pair of gloves. Some manufacturers employ a cutting-machine, for giving the shape to each piece of leather by one descent of a cutting-edge; but we believe that the use of such a machine is rather an exception than a rule.

If the operative glovers live in or near Worcester, they go to the house of the manufacturer, receive the leather in small parcels, and carry it home to work up into gloves. But if they live ten or twelve miles out, a curious system is followed. The manufacturer sends an agent, once a week, or as often as may be deemed necessary, who opens a temporary warehouse at a public-house or at some hired room, and there meets all the humble workpeople who live within a few miles on every side. Each operative brings to the agent the gloves which he or she may have made since the last visit, receives the money-payment for the labour, and takes home another supply of leather, to be worked up before the period of the next visit. Precision, certainty, and economy of time result from this plan. There is one great focus at Worcester; around which, at a distance of several miles, are minor foci. These smaller foci draw towards themselves the labour of a little circle each, and then yield them up to the central mart, whence the capital comes which sets all this productive industry into action.

Following one of the operative glovers to her home, we shall see that her only working implements, besides needles and thread or silk, is a clasp or clam which she holds between the feet and knees, and which acts as a pincer or vice to retain the glove in a fixed position during the process of sewing. In some few cases, however, a little instrument is employed for ensuring regularity in the stitches: this is a kind of brass comb, or notched plate, whose notches guide the needle. If we notice a few pairs of gloves, different in kind and price, we shall see that different appearances are presented by the threads; but all are produced by a kind of stitching or sewing precisely the same as that by which many other garments are made. Some females confine their attention to sewing the different pieces together; some work the ornamental stitching at the back of the glove; while others finish the top.

Under many an humble roof in the outskirts of Worcester may be seen a mother and her daughters thus employed. It is, under the average state of trade a close day's work which will yield a shilling to the workwoman. The occupation is somewhat analogous in this respect to the straw-plait working of Bedfordshire and Buckinghamshire, which, like it, is carried on in the cottages. It is possible that we might be able to construct a sort of map of cottage-industry in England, consisting of certain centres, around which were grouped the cottagers engaged in some one occupation. Thus taking Worcester as a centre for the glove-trade, and Redditch as another for the needle-trade, we should find these two groups meeting each other in some intermediate point; and we should perhaps find a third group filling or partially filling the space between those of Worcestershire and those of the straw-plait counties.

There are several towns in England which now possess, or have at former times possessed, a reputation for glove-making. Woodstock gloves have been known ever since the time of Queen Elizabeth, who is said to have received a pair during one of her 'progresses.' They are made of English deer, sheep, and lambs' skins, and have been much admired for the beauty of their workmanship. Hexham gloves were formerly much worn, especially as gauntlets to suits of armour; but in modern times the trade has declined, probably from the stout and unwieldy nature of the gloves: the Hexham tan-gloves were made of tanned sheep-skins. A kind of glove, made of native sheep and lamb skins, was formerly much esteemed under the name of York tans, being made to a considerable extent in that city. The Hereford beaver-gloves were similarly in repute, and at one time employed three thousand persons in their manufacture. At Ludlow and at Kington, in past times, large quantities of gloves were made, but the number has now greatly declined. A similar remark may be made in reference to the Leominster gloves. Yeovil is one of the most important of our glove towns. The number of pairs made there has been estimated at three hundred thousand dozens annually; and the number of operative glovers within the district of which Yeovil is the centre, twenty thousand. The finer kinds of gloves, as well as military gloves, are made here; formerly English skins were wholly used, but now Spanish, Italian, and German lamb-skins are the principal kinds

employed. Martock, Milborne Port, Glastonbury, Wells, Shepton Mallet, and Torrington, are all centres to a limited amount of glove-making.

There are two circumstances which have made a notable change in the glove-trade of late years, viz. the introduction of cotton or 'Berlin' gloves, and a repeal of the prohibition to the importation of French gloves. With respect to the former cause, an entirely new branch of manufacture has sprung up, chiefly in Nottingham and Leicester, where vast quantities of cotton-gloves are now made. As to the second cause, the same complaints have been made as in most other instances of the repeal of prohibition; the ruin of the home-trade has been foretold and the most gloomy thoughts entertained by many engaged in the leather-glove manufacture. There is, however, in Mr. M'Culloch's 'Commercial Dictionary,' a paragraph on this subject so important, that, though rather long, we will quote it entire:—"The importation of leather-gloves and mitts was formerly prohibited under the severest penalties. This prohibition had the effect, by preventing all competition and emulation with the foreigner, to check improvement, and to render British gloves at once inferior in quality and high in price. This system was, however, permitted to continue till 1825, when the prohibition was repealed, and gloves allowed to be imported on payment of duties which, though high, are not prohibitory. This measure was vehemently opposed, and many predictions were made of the total ruin of the manufacture. But in this, as in every similar instance, experience has shown that the trade had not been really benefited, but that, on the contrary, it had been injured by the prohibition. The wholesome competition to which the manufacturers now felt themselves, for the first time, exposed, made them exert all their energies; and it is admitted on all hands that there has been a more rapid improvement in the manufacture during the last half-dozen years than in the previous half-century. There is still, no doubt, a great deal of complaining of a decay of trade among the leather-glove manufacturers; but we are assured that if there be any real foundation for their complaints, it is ascribable far more to the growing use of home-made cotton-gloves than to the importation of foreign gloves; and had it not been for the improved fabric and greater cheapness of British leather-gloves that has grown out of the new system, it is abundantly certain that cotton-gloves would have gained still more rapidly on them. In point of fact, however, it does not appear that there has been any falling off in the leather-glove trade. On the contrary, the fair inference seems to be that it has materially increased; at all events there has been a very considerable increase in the number of skins brought from abroad to be used in the manufacture, and consequently in the number of pairs of gloves produced from such skins; and there is no reason for thinking that it is at all different with the other departments." This was written about five or six years after the admission of foreign gloves was permitted.

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. IV.

Giotto.

[Concluded from page 91.]

By the time Giotto had attained his thirtieth year, he had reached such hitherto unknown excellence in art, and his celebrity was so universal, that every city and every petty sovereign in Italy contended for the honour of his presence and his pencil, and tempted him with the promise of rich rewards. For the lords of Arezzo, of Rimini, and Ravenna, and for the Duke of Milan, he executed many works, now almost wholly perished. Castruccio Castricani, the warlike tyrant of Lucca, also employed him; but how Giotto was induced to listen to the offers of this enemy of his country is not explained. Perhaps Castruccio, as the head of the Ghibelline party, in which Giotto had apparently enrolled himself, appeared in the light of a friend rather than an enemy: however this may be, a picture which Giotto painted for Castruccio, and in which he introduced the portrait of the tyrant, with a falcon on his fist, is still preserved in the Lyceum at Lucca. For Guido da Polente, the father of the hapless Francesco di Rimini, he painted the interior of a church; and for Malatesta di Rimini he painted the portrait of that prince in a bark, with his companions and a company of mariners; and among them, Vasari tells us, was the figure of a sailor, who, turning round with his hand before his face, is in the act of spitting in the sea, so life-like as to strike the beholders with amazement; this has perished: but the figure of the thirsty man stooping to drink, in one of the frescoes at Assisi, still remains, to show the kind of excellence through which Giotto excited such admiration in his contemporaries—a power of imitation, a truth in the expression of natural actions and feelings, to which painting had never yet ascended or descended. This leaning to the *actual* and the *real* has been made a subject of reproach, to which we shall hereafter refer.

It is said, but this does not rest on very satisfactory evidence, that Giotto also visited Avignon, in the train of Pope Clement V., and painted there the portraits of Petrarch and Laura.

About the year 1327 King Robert of Naples, the father of Queen Joanna, wrote to his son the Duke of Calabria, then at Florence, to send to him, on any terms, the famous painter Giotto, who accordingly travelled to the court of Naples, stopping on his way in several cities, where he left specimens of his skill. He also visited Orvieto for the purpose of viewing the sculpture with which the brothers Agostino and Agnolo were decorating the cathedral, and not only bestowed on it high commendation, but obtained for the artists the praise and patronage they merited. There is at Gaeta a Crucifixion painted by Giotto, either on his way to Naples or on his return, in which he introduced himself kneeling in an attitude of deep devotion and contrition at the foot of the cross: this introduction of portraiture into a subject so awful was another innovation, not so praiseworthy as some of his alterations. Giotto's feeling for truth and propriety of expression is particularly remarkable and commendable in the alteration of the dreadful, but popular subject of the crucifix: in the Byzantine school, the sole aim seems to have been to represent physical agony, and to render it, by every species of distortion and exaggeration, as terrible and repulsive as possible. Giotto was the first to soften this awful and painful figure by an expression of divine resignation and by greater attention to beauty of form. A Crucifixion painted by him became the model for his scholars, and was multiplied by imitation through all Italy; so that a famous painter of crucifixes after the Greek fashion, Margaritone, who had been a friend and contemporary of Cimabue, confounded by the introduction of this new method of art, which he partly disdained and partly despaired to imitate, and old enough to hate innovations of all kinds, took to his bed "*infastidito*" (through vexation), and so died.

But to return to Giotto, whom we left on the road to Naples. King Robert received him with great honour and rejoicing, and being a monarch of

singular accomplishments, and fond of the society of learned and distinguished men, he soon found that Giotto was not merely a painter, but a man of the world, a man of various acquirements, whose general reputation for wit and vivacity was not unmerited. He would sometimes visit the painter at his work, and while watching the rapid progress of his pencil amused himself with the quaint good sense of his discourse.

"If I were you, Giotto," said the king to him one very hot day, "I would leave off work, and rest myself." "And so would I, sire," replied the painter, "if I were *you!*" The king in a playful mood desired him to paint his kingdom, on which Giotto immediately sketched the figure of an ass with a heavy pack-saddle on his back, smelling with an eager air at another pack-saddle lying on the ground, on which were a crown or sceptre. By this emblem the satirical painter expressed the servility and the fickleness of the Neapolitans, and the king at once understood the allusion.

While at Naples Giotto painted in the church of the Incoronata a series of frescoes representing the Seven Sacraments according to the Roman ritual. These still exist, and are amongst the most authentic and best preserved of his works. The Sacrament of Marriage contains many female figures beautifully designed and grouped, with graceful heads and flowing draperies. This picture is traditionally said to represent the marriage of Joanna of Naples and Louis of Taranto; but Giotto died in 1336, and these famous espousals took place in 1347—a dry date, which sometimes confounds a very pretty theory. In the Sacrament of Ordination there is a group of chanting boys, in which the various expressions of the act of singing are given with that truth of imitation which made Giotto the wonder of his day. His paintings from the Apocalypse in the Church of Santa Chiara were whitewashed over about two centuries ago by a certain prior of the convent, because in the opinion of this barbarian *they made the church look dark!*

Giotto quitted Naples about the year 1328, and returned to his native city with great increase of riches and fame. He continued his works with unabated application, assisted by his pupils, for his school was now the most famous in Italy. Like most of the early Italian artists he was an architect and sculptor as well as a painter; and his last public work was the famous Campanile, or Bell-tower, at Florence, founded in 1334, for which he made all the designs, and even executed with his own hand the models for the sculpture on the three lower divisions. According to Kugler, they form a regular series of subjects illustrating the development of human culture through religion and laws, "conceived," says the same authority, "with profound wisdom." When the emperor Charles V saw this elegant structure he exclaimed that it ought to be 'kept under glass.' In the same allegorical taste Giotto painted many pictures of the Virtues and Vices, ingeniously invented, and rendered with great attention to natural and appropriate expression. In these and similar representations we trace distinctly the influence of the genius of Dante. A short time before his death he was invited to Milan by Azzo Visconti. He executed some admirable frescoes in the ancient palace of the dukes of Milan, but these have perished. Finally, having returned to Florence, he soon afterwards died—"yielding up his soul to God in the year 1336, and having been," says Vasari, "no less a good Christian than an excellent painter," was honourably interred in the church of Santa Maria del Fiore, where master his Cimabue had been laid with similar honours thirty-five years before. Lorenzo de Medici afterwards placed above his tomb his effigy in marble, from which the portrait at the head of this essay has been taken. Giotto left four sons and four daughters, but we do not hear that any of his descendants became distinguished in art or otherwise.

In the following number we shall consider the personal character and influence of Giotto, both as a man and an artist, of which many amusing and interesting traits have been handed down to us.*



Transparent Depth of the Sea on the Newfoundland Coast.—My attention was caught by something moving on the bottom in twelve or fifteen feet of water, and I soon found it to be covered with lobsters. One or two of these, by means of a pointed stick, we managed to capture. The singular clearness of the water is most remarkable when the surface is still; the echini, shell-fish, and [illegible] clinging to the rocks, crabs and lobsters crawling on the bottom, fish, medusæ, and myriads of sea-creatures floating in its depths, were as in air itself. In the passage between Trinity Island, or Lewis's Island, and the Flying Point, the bottom of the sea consisted of huge peaks and mounds of white granite rising from dark and deep hollows. The extreme clearness of the water rendered these cliffs and peaks all visible as we approached them, though none reached to within three or four fathoms of the surface; and the sensation experienced in sailing over them was most singular, and to me very uncomfortable. I could not look over the boat without extreme giddiness, as if suspended on some aerial height hanging over a tremendous gulf. The same sensation was described to me by a gentleman I afterwards met with, an experienced hunter and sailor, as assailing him upon his once in smooth water taking a boat within the space of some sunken rocks off the W[illegible] Island, on which the water broke in bad weather. These rocks he described as three peaks rising from an apparently unfathomable depth; and the sensation, as his boat gently rose and fell between them, was so unpleasant, and indeed awful, that he gladly got away as fast as he could.—*Jukes's Excursions.*

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* In the foregoing sketch some disputed points in the life of Giotto are for obvious reasons left at rest, and the order of events has been somewhat changed, in accordance with more exact chroniclers than Vasari.



[Sir Roger de Coverley.]

SIR ROGER DE COVERLEY.—No. III.

The fame of the Spectator's Sir Roger de Coverley was revived some twenty years ago by one of the most beautiful pictures of the modern English school, the charming representation, by Newton, of the fine old squire coming out of church, amidst the reverential greetings of his affectionate tenantry. This was a real old English scene; and such as touched our sympathies even in an age when much of this cordial intercourse between the great and the humble has passed away. The paper of the 'Spectator' upon which this picture is founded is by Addison, and in his best style:—

"I am always very well pleased with a country Sunday, and think, if keeping holy the seventh day were only a human institution, it would be the best method that could have been thought of for the polishing and civilizing of mankind. It is certain the country-people would soon degenerate into a kind of savages and barbarians, were there not such frequent returns of a stated time, in which the whole village meet together with their best faces, and in their cleanliest habits, to converse with one another upon different subjects, hear their duties explained to them, and join together in adoration of the Supreme Being. Sunday clears away the rust of the whole week, not only as it refreshes in their minds the notions of religion, but as it puts both the sexes upon appearing in their most agreeable forms, and exerting all such qualities as are apt to give them a figure in the eye of the village. A country fellow distinguishes himself as much in the

churchyard, as a citizen does upon the 'change, the whole parish politics being generally discussed in that place either after sermon or before the bell rings.

"My friend Sir Roger, being a good churchman, has beautified the inside of his church with several texts of his own choosing. He has likewise given a handsome pulpit-cloth, and railed in the communion-table at his own expense. He has often told me, that at his coming to his estate he found his parishioners very irregular: and that in order to make them kneel, and join in the responses, he gave every one of them a hassock and a Common Prayer-book; and at the same time employed an itinerant singing-master, who goes about the country for that purpose, to instruct them rightly in the tunes of the Psalms, upon which they now very much value themselves, and indeed outdo most of the country churches that I have ever heard.

"As Sir Roger is landlord to the whole congregation, he keeps them in very good order, and will suffer nobody to sleep in it besides himself; for if by chance he has been surprised into a short nap at sermon, upon recovering out of it he stands up and looks about him, and if he sees anybody else nodding, either wakes them himself, or sends his servants to them. Several other of the old knight's particularities break out upon these occasions. Sometimes he will be lengthening out a verse in the singing Psalms, half a minute after the rest of the congregation have done with it; sometimes when he is pleased with the matter of his devotion, he pronounces Amen three or four times in the same prayer; and sometimes stands up when everybody else is upon their knees, to count the congregation, or see if any of his tenants are missing.

"I was yesterday very much surprised to hear my old friend, in the midst of the service, calling out to one John Matthews to mind what he was about, and not disturb the congregation. This John Matthews it seems is remarkable for being an idle fellow, and at that time was kicking his heels for his diversion. This authority of the knight, though exerted in that odd manner which accompanies him in all the circumstances of life, has a very good effect upon the parish, who are not polite enough to see anything ridiculous in his behaviour; besides that the general good sense and worthiness of his character make his friends observe these little singularities as foils that rather set off than blemish his good qualities.

"As soon as the sermon is finished, nobody presumes to stir till Sir Roger is gone out of the church. The knight walks down from his seat in the chancel between a double row of his tenants, that stand bowing to him on each side, and every now and then inquires how such a one's wife, or mother, or son, or father do, whom he does not see at church; which is understood as a secret reprimand to the person that is absent.

"The chaplain has often told me, that upon a catechising day, when Sir Roger has been pleased with a boy that answers well, he has ordered a Bible to be given to him next day for his encouragement, and sometimes accompanies it with a flitch of bacon to his mother. Sir Roger has likewise added five pounds a year to the clerk's place; and, that he may encourage the young fellows to make themselves perfect in the church service, has promised upon the death of the present incumbent, who is very old, to bestow it according to merit.

"The fair understanding between Sir Roger and his chaplain, and their mutual concurrence in doing good, is the more remarkable, because the very next village is famous for the differences and contentions that arise between the parson and the 'squire, who live in a perpetual state of war. The parson is always preaching at the 'squire, and the 'squire, to be revenged on the parson, never comes to church. The 'squire has made all his tenants atheists and tithe-stealers, while the parson instructs them every Sunday in the dignity of his order, and insinuates to them, in almost every sermon, that he is a better man than his patron. In short, matters are come to such an extremity, that the 'squire has not said his prayers either in public or private this half-year; and the parson threatens him, if he does not mend his manners, to pray for him in the face of the whole congregation.

"Feuds of this nature, though too frequent in the country, are very fatal to the ordinary people; who are so used to be dazzled with riches, that they pay as much deference to the understanding of a man of an estate as of a man of learning; and are very hardly brought to regard any truth, how important soever it may be, that is preached to them, when they know there are several men of five hundred a-year who do not believe it."

The quiet humour of this pleasant description furnishes in itself a tolerable example of the state of opinion in the reign of Queen Anne—our Augustan age, as it has often been called. It shows the cold and worldly aspect which the most solemn institutions presented to the eye of the conventional moralist. There is something much higher in the association of Christians in public worship than even the good of meeting together with "best faces and cleanliest habits." Sunday is to be observed for something better than "clearing away the rust of the week," and "putting both sexes upon appearing in their most agreeable forms." But for too long a period this has been very much the orthodox notion of Sunday and Sunday duties; and the real purpose of public worship, that of calling forth the spiritual and unworldly tendencies of our nature, to the exclusion of the ambition and vanity of every-day life, is only beginning yet to be generally felt in town or village. We lost for two or three centuries the zealous spirit which made the cathedral and the church a refuge from the hard and irritating cares which belong to a life of struggle and vexation; which there lifted us up to a calm and earnest reliance on the protection of the great Father of all; which made all men equal in their capacity for partaking of this elevation of spirit; which for a while excluded the distinctions that belong to transitory things alone. The solemn responses, the soul-uttering chants, the assembling together in temples venerable for their antiquity and impressive in their beauty, gave a loftier tone to the mind of the most uninformed than belongs to the discussion of parish politics "after sermon or before the bell rings." A reform of somewhat too sweeping character changed the feelings of the people. Religion came either to be looked at as a severe thing or as a formal thing; and then followed what Addison has painted too truly in the conclusion of his paper, "the differences and contentions between the parson and the 'squire." In this respect we may earnestly hope that the description of the Essayist is wholly obsolete.

PROGRESSES OF QUEEN ELIZABETH.
No. III.

THE QUEEN AT CAMBRIDGE.

In 1563 there appears to have been no progress. London was suffering through a dearth, a scarcity of money, and from the prevalence of the pestilence, which had been introduced by the troops who had been unsuccessfully defending Hâvre under the Earl of Warwick. Of this disorder more than 20,000 of the citizens died; and, according to Holinshed, the Queen ordered that "the new mayor elected should keep no feast at Guildhall, for doubt that through bringing together such a multitude the infection might increase."

In 1564, on the 27th of July, the Queen was again on her Progresses, and was at the Lord Treasurer Cecil's house at Theobalds, afterwards at her own house at Enfield, and on the 5th of August she reached Cambridge, where extensive preparations had been made for her reception. The students had been directed to "put themselves in all readiness to pleasure her Majesty, and to welcome her with all manner of scholastical exercises, viz., with sermons, both in English and Latin; disputations in all kinds of faculties, and playing of comedies and tragedies, orations and verses, both in Latin and Greek, to be made and set up ..... in the way that her Majesty should go or ride:" "provision of beer, ale, and wine was sent to the King's College," where she was to lodge; and "the Vice-Chancellor and the Mayor took order for the well-paving of all the town, and that every inhabitant should provide sufficient sand to cover the streets at the coming of the Queen's Majesty."

Sir William Cecil, who was Chancellor of the University, and Lord Robert Dudley (afterwards Earl of Leicester), the Lord High Steward, with a numerous train, arrived on the previous day to her Majesty, to assist in the preparations: they were received with much ceremony, and to each of them was presented, as also to the Duke of Norfolk, the steward of the town, "two pair of gloves, a march-pain,* and two sugar-loaves;" while the Earl of Suffolk and the rest of the nobility had gloves, but no march-pain or sugar-loaves."

On the 5th the whole University met the Queen at the corner of the Queen's College and Martin Gill's house, "the whole lane between the King's College and the Queen's College was strewed with rushes, and flags hanging in divers places, with coverlets and boughs, and many verses fixed upon the wall," the scholars crying, as commanded, "Vivat Regina," lowly kneeling. The corporation of the town had met her Majesty a little above Newnham, and delivered to her the mace, with "a fair standing cup, which cost 19*l.*, and twenty old angels in it," which she received, returning the mace to the mayor, and giving the cup with the angels to her footman. She was on horseback, dressed "in a gown of black velvet pinked; a caul upon her head, set with pearls and precious stones; a hat that was spangled with gold, and a bush of feathers." The orator of the University then made his speech in Latin. "First he praised and commended many singular virtues set and planted in her Majesty, which her Highness not acknowledging of, she shaked her head, bit her lips and her fingers; and sometimes broke forth into passion, and these words: 'Non est veritas, et utinam;'" but on his praising virginity, she replied, "God's blessing of thine heart, there continue." At the conclusion, she commended the speech, adding, "That she would answer him again in Latin, but for fear she should speak false Latin, and then they would laugh at her." She then dismounted, and was conducted under a canopy into King's College Chapel, where prayers were said, but the Queen declining to join in the service, prayed privately; she greatly praised the beauty of the chapel as "above all other within her realm."† On her leaving the chapel for her lodgings in King's College, there were presented to her, in the name of the University, "four pair of Cambridge double gloves, edged and trimmed with two laces of fine gold, and six boxes of fine comfits and other conceits." On the following day, which was Sunday, the Queen attended service in the chapel in the morning, praising the Latin sermon as the first she had ever heard in that tongue, and never hoped to hear a better. From hence she was conducted back under a canopy borne by four doctors, "which the footmen as their fee claimed, and it was redeemed for 3*l.* 6*s.* 8*d.*" On this day the chancellor and vice-chancellor entertained the University at dinner, to which the Queen sent five bucks. She attended even-song, "which ended, she departed back by the same way to the play 'Aulularia Plauti;' for the hearing and playing whereof was made by her Highness' surveyor, and at her own cost, in the body of the King's College Church, a great stage, containing the breadth of the church from the one side to the other, that the chapels might serve for houses. In the length it ran two of the lower chapels full, with the pillars on a side." Her Majesty sat on the south side under a cloth of state, the rood-loft was made into a stage for ladies and gentlemen to stand in, and the tables beneath it were "enlarged and railed in for the choice officers of the court. A multitude of the guard stood upon the ground by the stage-side, having every man in his hand a torch-staff for the lights of the play (for no other lights were occupied); and would not suffer any to stand upon the stage, save a very few upon the north side." With this curious account of the formation and location of the stage, we have little or nothing of the play. "The Queen took her seat, and heard the play fully," is all that is told us, and that about twelve o'clock she departed to her lodgings.

On the Monday she attended disputations in philosophy and physic in St. Mary's Church, where a great stage was provided for the purpose, from one o'clock in the afternoon till seven, declaring herself well entertained, but detecting faults in the dresses of some of the dignitaries, and noting that some Masters were "but Masters, because their habits and hoods were torn and too much soiled." At nine she attended the performance of 'Dido,' a tragedy, "in hexametic verse," in King's College Chapel.

On Tuesday there was nothing public, the Queen holding a privy council in the south vestry; but in the evening she again visited the theatre in King's College Chapel to witness the performance of a play in English called 'Ezekias.' This play was the production of Dr. Nicholas Udall, Master of Eton College, the author of 'Ralph Royster Doyster,' the earliest existing English comedy.

On Wednesday, at six in the morning, "riding in state royall, all the lords and gentlemen riding before her Grace, and all the ladies following on horseback," the Queen visited Clare Hall, King's College, Trinity Hall, Gonvill and Caius, Trinity, St. John's, Christ's, and Benet Colleges, Pembroke Hall, Peter House, Queen's College, and Katherine Hall, being addressed at most of them with an oration, those at Trinity and Christ's College being in Greek, to the latter of which she replied in the same language; talking much with students in Latin during her progress, and dismissing them on her return in that language. At three she attended the disputations in divinity, which were stayed at seven o'clock, before they were ended:" and "the night coming on, clean took away the disputation of the lawyers." At the end, the lords, especially the Duke of Norfolk, the Steward of the Town, and Lord Robert Dudley, the High Steward of the University, "kneeling down, humbly desired her Majesty to speak something to the University, and in Latin: this, after some affected reluctance, she did at considerable length, and of which we give the translation of the following complimentary conclusion:—"But now you see the difference between true learning and an education not well retained. Of the one of which you yourselves are all more than sufficient evidence; and of the other, I, too inconsiderately indeed, have made you all witnesses. It is time then

* A sort of confection or sweetmeat, made of almonds, sugar, and other ingredients.

† For a view of the chapel, see No. 262.

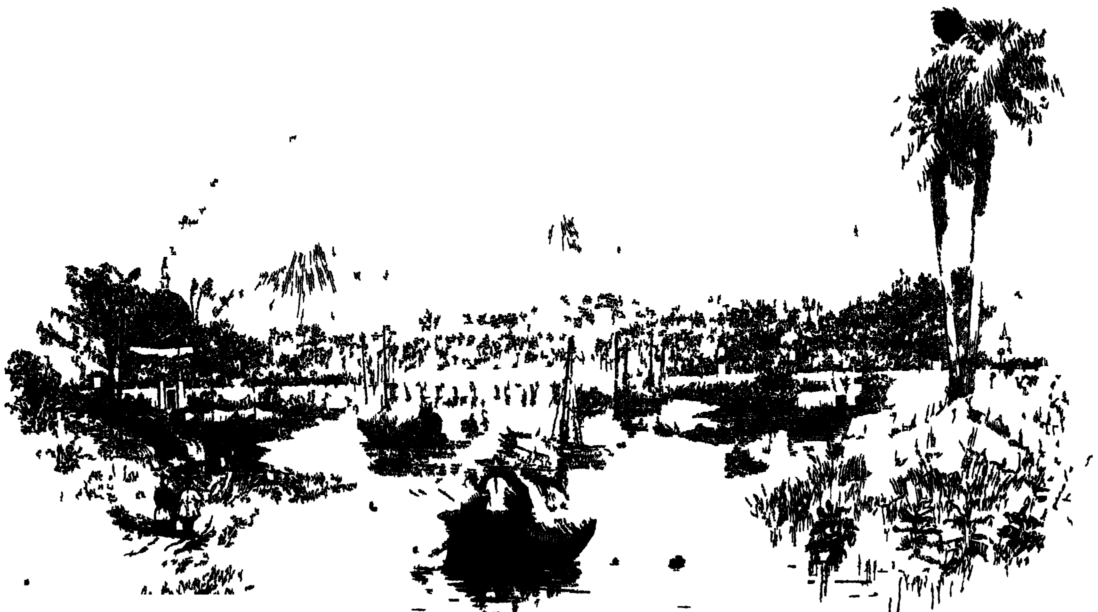
that your ears which have been so long detained by this barbarous sort of an oration, should now be released from the pain of it. But the auditors were all "marvellously astonied" and burst forth in open voice "Vivat Regina!" "And so her Majesty cheerfully departed to her lodging, declining to be present at the performance of the Ajax Flagellifer of Sophocles, being fatigued with visiting the colleges, attending the disputations, "and over-watched with former plays, as it was very late nightly before she came to them, as also departed from them; and beside intending to leave Cambridge early in the morning.

There appears to be little at all worthy of remark in the reception of the Queen at Cambridge. A book was prepared for her Majesty previous to her coming, "containing all their verses, both of Greek and Latin, Hebrew, Chaldee, and English, bound in a parchment covering, gilt with flowers of gold at the four corners, knit with green ribband string," but nothing of them has been preserved. Of the members of the University, the only one who appears to have been distinguished by her Majesty, was Thomas Preston, "who acted so admirably well in the tragedy of 'Dido' and did so gracefully dispute before her that he gave him 20*l* per annum for his so doing. A most notable instance of liberality in the Queen, who was generally sparing in such reward. Preston's antagonist in these disputations was Thomas Cartwright, and Fuller in his 'History of Cambridge' remarks, "Cartwright had dealt most with the Muses, Preston with the Graces. Cartwright disputed like a ... Preston like a ... scholar. And the Queen upon parity of ... always preferred properness of person. Preston, who with her host Dr Baker, the Provost of King's College, and others, met her at nine o'clock on Thursday morning on her departure, made a farewell oration, with which she was so well pleased, that she gave him her hand to kiss, and "openly called him *her scholar*."

She proceeded from Cambridge to the Bishop of Ely's at Stanton, and from thence to Sir Henry Cromwell's at Hinchinbrooke Priory.

In 1565 she visited the newly made Earl of Leicester at Kenilworth, passing through Coventry, where the corporation received her magnificently, the recorder, John Throgmorton whom she knighted, making her a complimentary oration and presented her in the name of the town with a purse supposed to be worth twenty marks and in it about 100*l* in gold angels, which her Grace accepting, was pleased to say to her lords, it was a good gift, 100*l* in gold. 'I have but few such gifts.' To which the mayor answered boldly, 'If it please your Grace there is a great deal more in it.' 'What is that?' said she. 'It is the hearts of all your loving subjects.' 'We thank you, Mr Mayor,' said she, 'it is a great deal more indeed.' It was in ... great measure ... that Elizabeth acquired ... she did the ... of her people.

Her visits to Kenilworth were repeated in 1566 and 1572. The last was ... unbounded ... magnificence ... Kenilworth ... already described in No ... we have given a view of the past and present state of the castle, we shall not have occasion to go over the ... ground again.



[Foo-choo-foo.]

FOO-CHOO-FOO.

NING-PO, of which we have given an account in No 639, is the next of the five ports south of Shang-hae; to this succeeds Foo-choo-foo, the capital and principal port of the province of Fo-kien, where chiefly the black tea is produced which is imported into this country, and a considerable quantity of tobacco is also grown.

Foo-choo-foo lies on the north-east coast, in the Fo-kien Channel, in about 26° N lat and 119° E long, on the banks of the Min-ho, which empties itself into

the Bay of Ho-sien, and about thirty miles from the river's mouth called Woo-foo-min. Fort Minga, which defends the passage of the Min, is situated about twelve miles from the river's mouth, and is the only serviceable fortress, although numerous others in a dismantled state dot the banks on each side in going up, and add to its picturesque beauty. The war-junks go no higher than Mingan.

On leaving Mingan the channel narrows to much less than half a mile broad, and, a few miles higher up, divides into two branches, the northern one of which leads to the city: the banks of the river are dotted with the richest verdure, and in some places the bold appearance of the mountains, rising abruptly to a height of several thousand feet, is very remarkable: they are cultivated to the very ridges with grain, rice, and paddy, adding to the beauty of the scenery, which is further heightened by bold bluff points jutting abruptly into the river.

On reaching one of these points, which terminates the circuitous and serpentine direction of the branch of the river from Fort Minga, the town of Foo-choo-foo breaks upon the view in all its splendour, the bridge of thirty-six arches (and not thirty-three, as erroneously stated by some) stretching across the river, the banks on both sides dotted here and there with picturesque pagodas and the country-seats of the mandarins of rank, and luxuriating in all the richness of tropical vegetation; the stately palm-tree, cocoa and betel-nut, combined with the plantain and banana, being seen here in all their native beauty. The effect is greatly heightened by the numerous and various kinds of picturesque boats which dot the river, from the humble sampan to the unwieldy junk: whilst close to the town appears a forest of masts belonging to different coasting craft: the river above bridge winds away into serpentine obscurity, and the background is terminated by lofty mountains fading away into the blue distance.

The town is built on both sides the river, and consists of the usual low houses of Chinese architecture and narrow streets, which, however, are necessary to guard against the powerful rays of the sun.

The bridge, which is built on diamond-shaped piles of granite, is a clumsy-looking affair upon close inspection, although at a distance it assumes so picturesque an appearance: its length is about four hundred yards, and breadth twelve to thirteen: there were formerly temporary shops constructed upon it, but they are now nearly all removed.

The anchorage at Foo-choo-foo is good, and of course, from its inland situation, perfectly secure: there is always from four to five fathoms water, the current is very rapid, the flood-tide scarcely perceptible.

The inhabitants appear courteous and mild in their manners, but intercourse with them was checked by the interference of the mandarins: they appeared a much superior race of people from those we met at Canton, and, as at Amoy, are hardy and industrious.

A great trade is carried on with the neighbouring province of Che-kiang in wood, timber, and tobacco; but a number of junks from Foo-choo-foo find their way to Manilla, Singapore, and other islands in the Eastern Archipelago, touching generally in the first instance at Amoy, from whence the best sea-going Fokien sailors are selected to man the sea-junks. Dried fruits, amongst others the lee-chee, are likewise largely exported.

The importance of Foo-choo-foo to British enterprise must be extremely great, as vessels of a large burthen can lay within seven or eight miles of the city, whence the tea can be loaded at once from the large chop-boats of the country, which, by means of the Min and its branches, have an easy water-communication with the tea-farms of the interior. Mr. Davis, in his 'Sketches of China,' observes in relation to its commercial importance:—"By the restrictions which have confined the tea-trade to Canton we have been obliged to pay for the transport of the black teas over an immense distance, in which lofty mountains are to be crossed, and shallow rivers navigated with great difficulty, involving the additional charge of about 25*s*. in every pecul weight (133 lbs.), or about 200,000*l*. on the annual supply. Mr. Ball, formerly inspector of teas to the Company at Canton, first drew attention to this subject many years ago, and his calculations seem to have been verified since. Should we, therefore, ever be in a situation to choose the most advantageous position for the tea-trade, there seems to be no doubt of Foo-choo-foo being the port selected. But it is not on account of teas only that the city in question has been singled out as the most favourable for the British trade: some calculations and estimates exist to show that for our woollen and other manufactures Foo-choo-foo must be infinitely superior to Canton, as being much nearer to the places of consumption. In this single view of the question, however, and apart from the main article of teas, it is most probable that Shang-hae is superior to Foo-choo-foo."

The climate of Foo-choo-foo is on the whole healthy, and would be more so but for the filthy state of the streets in the city and suburbs, where offal of all kinds is thrown indiscriminately about, producing an odour very offensive to the senses. The mountains in the vicinity likewise tend to its salubrity by rarefying the air: in winter the cold is felt severely; as is also the heat in summer, when the exhalations from the rice and paddy grounds produce frequent cases of fever and ague.

ECONOMICAL USES OF THE BIRCH-TREE.

[Continued from page 92.]

In the last article on this subject we stated that the sap or juice of the birch is, like almost every other part, applied to useful porposes. This sap is made into beer, wine, and vinegar, besides yielding sugar and spirit. The Russians use the syrup of the sap, without crystallization, as a substitute for sugar. During the siege of Hamburg by the Russians in 1814, almost all the birch-trees in the neighbourhood were destroyed by some of the semi-barbarous soldiers of the Russian army, for the sake of the sap. Sugar may be procured from the sap by boiling and evaporation. Beer is produced by fermenting the sap with yest, hot water, and hops, in the manner of English brewing.

Wine is made from the birch-sap in the following manner:—The sap is first obtained by boring a shallow hole in each tree, near the ground, and on the south side of the trunk; each tree being, in some countries, bored with several holes, instead of one. Each hole has a kind of fosset fixed to it, formed either of a large quill or of a piece of elder-wood deprived of its pith, the outer end of the tube or fosset being placed in a vessel or large bladder to receive the sap. In some places the collectors of the sap cut off the extremity of each branch, tying a vessel or bladder to the end of the wounded part. When a sufficient quantity of sap has been collected, the hole in the tree is stopped with a wooden peg, or the end of the wounded branch is covered with pitch. This operation is always performed in spring, and most sap is said to be procured after a very severe winter. As the sap soon spoils by being kept, several trees are opened at the same time, in order to collect a sufficient quantity at once, which is effected usually about the hour of noon. When the wine is to be made, the sap is boiled with moist sugar or honey, in the proportion of four pounds of sugar to a gallon of sap. While boiling, the scum is taken off

as fast as it rises, till the liquor is quite clear. It is then worked with yest in the usual way. The juice and rind of a lemon and of a Seville orange added to every gallon of clear liquor greatly improves the flavour. Twigs of sweet-brier are sometimes put into the cask when the wine is tunned, to give it a fragrance, an object which used in former times to be effected by using cinnamon and other spices. Wine made in this way, being kept three months before bottling, and twelve months before being used, is both agreeable and wholesome, and effervesces something like champagne.

A useful oil is also obtained from the birch-tree by a kind of distillation effected in the following manner:—An excavation is first made in the ground ten or twelve feet deep, and in the form of an inverted cone, lined on the inside with clay. Birch-bark (from which the product is obtained) being collected and placed in this rude kind of kiln, is covered with turf and then ignited. During the smothered combustion of the bark, oil exudes from it, and passes through a hole made in the bottom of the kiln, into a vessel placed to receive it, from which it is transferred to casks for exportation. The liquor produced consists of oil and pyroligneous acid, and is used for tanning hides, to which it gives the peculiar odour recognised in 'Russia leather.' The oil when purified is quite clear, and is used in medicine, both internally and externally; and the pyroligneous tar-like liquid which is separated from it is used for many of the same purposes as tar.

All the details hitherto given relate to the common or white birch, incontestably the most valuable of all the species. The species called in England the paper birch, in Paris the black birch, and in America the canoe birch, is a valuable American tree, whose characteristic value is expressed by the last of these three appellations, since its bark is extensively employed in the construction of canoes. The canoe birch flourishes principally in the forests of Lower Canada, New Brunswick, and the northern portion of the United States. It attains its largest size in the declivity of hills and in the bottom of fertile valleys; being under such circumstances frequently found with a height of seventy or eighty feet and a diameter of three feet. Its branches are slender, flexible, and covered with a shining brown bark, dotted with white.

The heart or perfect wood of this tree, when first laid open, is of a reddish hue, and the sap is perfectly white. The wood has a fine glossy grain, with a considerable share of strength. In the district of Maine tables are frequently made of it, and stained in imitation of mahogany. A section of the trunk of this tree, a foot or two in length, immediately below the first ramification, often exhibits very elegant undulations of the fibre, resembling bunches of feathers or sheaves of corn: such pieces are divided into thin veneers for inlaying mahogany; and in Boston and the towns situated farther north, they are generally employed by cabinet-makers to embellish their work. The wood affords excellent fuel, and is exported in great quantities from Maine to Boston.

The bark of the canoe birch, in trees not exceeding eight inches in diameter, is of a brilliant white, and is almost indestructible. Trees long since prostrated by time or storms are often met with in the forests, whose trunks appear sound externally, while the bark contains only a friable substance like vegetable mould. In Canada and the Northern United States the country-people place large pieces of the bark immediately below the shingles of the roofs of houses, to form a more impenetrable covering. Baskets, boxes, and portfolios are made of it, sometimes embroidered with silk of different colours. Divided into very thin sheets, it forms a substitute for paper; and, placed between the soles of the shoes and in the crown of the hat, it is a 'waterproof' material, in the best sense of the term.

It is, however, in the construction of canoes that the bark of this species of birch is most valuably employed, an application for which it is superior to every other kind of bark. To procure proper pieces the largest and smoothest trunks are selected. In the spring of the year two circular incisions are made several feet apart, and two longitudinal ones on opposite sides of the tree; after which, by introducing a wooden wedge, the bark is easily detached. These sheets or plates of bark are usually ten or twelve feet long, by two and a half or three feet in width. To form the canoe, these pieces are stitched together by means of fibrous roots of the white spruce, about the size of a quill, which are deprived of the bark, split, and softened in water. The seams are coated with resin. In such canoes as these the Canadian 'voyageurs' have been wont to ascend the Ottawa and other rivers, on their fur-buying expeditions; the canoes being so very light as to be easily carried each on the shoulders of one man. A canoe fitted to convey four passengers will only weigh forty or fifty pounds; but some of them are calculated to contain fifteen persons. It was to such canoes as these that Sir Alexander Mackenzie alluded when, speaking of the equipment of a fleet of canoes at Montreal preparatory to a departure up the Ottawa to the Lakes, he said:—"An European, on seeing one of these slender vessels thus laden, heaped up, and sunk with her gunwale within six inches of the water, would think his fate inevitable in such a boat, when he reflected on the nature of the voyage; but the Canadians are so expert, that few accidents happen."

In the Settlements of the Hudson's Bay Company, tents are made of the bark of the canoe birch, which for that purpose is cut into pieces twelve feet long by four feet wide. These are sewed together by threads made of the white-spruce rootlets; and so rapidly is a tent put up, that a circular one, twenty feet in diameter by ten feet high, requires not above half an hour in pitching. These are called 'rind-tents,' and their utility is acknowledged by all travellers and hunters in those regions. They are used throughout the year; but during the hot months of June, July, and August they are found particularly acceptable.

There are other species of birch more or less valuable in the arts. The Tall birch, an American species, is a beautiful tree, often rising to a height of seventy or eighty feet, and having the trunk uniform, straight, and destitute of leaves for a height of thirty or forty feet. It is particularly remarkable for the colour and arrangement of its epidermis, which is of a brilliant golden yellow, and frequently divides itself into very fine strips, rolled backwards at the ends and attached in the middle. The leaves, the bark, and the young shoots have all an agreeable taste and smell. It abounds in the forests of New Brunswick, Nova Scotia, and Maine; and is met with more sparingly in New Jersey and Pennsylvania, where it is found in moist and shady situations. The wood is not equal to that of some other kinds of birch, but is at the same time strong, and, when well polished, fitted to make handsome furniture. In Nova Scotia, and in the district of Maine, it is found by experience to be very way proper for that part of the frame-work of vessels which always remains in the water. In Maine it is employed for the yokes of cattle and for the frames of sledges; and in Nova Scotia the young saplings are almost exclusively employed for making the hoops of casks. Boards of this tree were formerly imported into Ireland and Scotland in large quantities, and were much in use in joinery. The wood is excellent for fuel, and the bark is largely employed by tanners.

The wood of the Pliant birch or Cherry birch is deemed better than that of any other American species. This tree, in favourable situations, exceeds seventy feet in height, with a diameter of nearly three feet. The outer bark, in old trees, detaches itself transversely at intervals, in hard plates or sheets six or eight inches broad; but in trees with trunks not more than eight inches in diameter, the bark is smooth, greyish, and perfectly similar in its colour and organization to that of the cherry-tree: hence one of its names. In the neighbourhood of New York this is one of the first trees to renew its leaves; these, during a fortnight after their appearance, are covered with a thick silvery down, which afterwards disappears. When bruised the leaves diffuse a very sweet odour; and as they retain this property when dry if carefully preserved, they make an agreeable substitute for tea, with the aid of milk and sugar. The wood, when freshly cut, is of a rosy hue, which deepens by exposure to the light. Its grain is fine and close: it possesses a considerable degree of strength, and takes a brilliant polish. In Massachusetts, Connecticut, and New York the wood of this birch is next in esteem to that of the wild cherry. Tables, bedsteads, arm-chairs, sofas, coach-panels, shoe-lasts, and a great many other articles are made of it. Hunter, in his notes to Evelyn's 'Sylva,' says that the sap of this tree is used by the inhabitants of Kamtschatka without previous fermentation; and that the natives strip off the bark when in a green state, cut it into long narrow strips like vermicelli, and, after drying it, stew it with their caviare.

The Dwarf birch, a native of Lapland, Sweden, Russia, Scotland, Canada, and all the colder regions of Europe and America, is a very useful tree to the Laplanders. Its branches furnish them with their beds and their chief fuel; its leaves yield a yellow dye, better than that obtained from the common birch: its seeds afford nourishment to the ptarmigan, or white partridge, which supplies a considerable portion of the Laplanders' food, and also forms an important article of commerce; and, for their medicine, it produces a peculiar kind of fungus, from which the *mora* or *amadou* is prepared, and which the Laplanders consider an efficacious remedy in all painful diseases.

The Black birch, like many others which we have noticed, is an American species, growing abundantly in Maryland, Virginia, Carolina, and Georgia. It grows, with the greatest luxuriance, on the sides of limpid streams which have a gravelly bed, and the banks of which are not marshy. The wood of this species is compact, and very nearly white; and the colour of the sap-wood and the heart-wood is very nearly the same. It is longitudinally marked by red veins, which intersect each other in different directions. The negroes make bowls and trays of it. The hoops for rice-casks are made of its young shoots, and of branches not exceeding an inch in diameter; and its spray is much used for making brooms.

We may terminate this brief notice by remarking that the use of the common birch-tree, in artificial plantations in Britain, is chiefly as coppice-wood; it is cut, every five or six years, for brooms, hoops, wattled-rods, crate-rods, &c.; every ten or twelve years, for faggot-wood, poles, fencing, and bark for tanners, the value of which is about half that of oak-bark: and every fifteen or twenty years, for herring-casks, &c.

FLOATING AND FLYING BRIDGES.

The military operations by which a body of troops is conveyed across a river supply the most instructive examples of the steps from whence have resulted the masterly and substantial bridges of modern times. The expedients which an army would adopt in a strange country are in some measure analogous to those which a rude nation would find most available, since the means at the disposal of both are very limited.

A canoe or raft, urged across the stream by oars, is obviously the most primitive mode of transit, and calls for very little notice here, a paper on the "Boats of Rude Nations" having been given in our last volume. But the operations of our military commanders have frequently brought to light the means of constructing boats at a few hours' notice, from materials found near the stream itself. The Duke of Wellington (then Colonel Wellesley), in his Indian campaign of 1800, having occasion to cross a river which by floods had become too deep to be fordable, caused a number of *basket-boats* to be constructed, of materials easily procurable: the boats were soon made, the army crossed the stream, and the commander fully succeeded in his object. Such basket-boats are much used in India, and are made as follows:—a number of pieces of split bamboo are laid on the ground, crossing each other near their centres, and fastened together with thongs. The ends of the bamboos are then raised to a sufficient height, fixed by stakes at due distances from each other, and then bound together by slips of bamboo, introduced alternately over and under the ribs, beginning from the bottom and working upwards, till the skeleton is completed. The ends of the ribs, above the intended height or depth of the basket, are then cut off, and the stakes removed. The frame is next turned over, and covered with hides (those of the animals, for instance, which may have been killed for food), the hide being secured with leather thongs. Such basket-boats are frequently made in India with a length of fifteen feet and a breadth of three; and such an one is capable of carrying thirty men, or a gun-carriage, or bullocks or horses, whose heads are fastened to the stern of the boat, and who are made to swim across.

The general of an army is sometimes constrained to the adoption of extraordinary expedients in crossing a river, where no boats are to be found, and time and circumstances prevent him from making any. The most simple of all bridges would be a plank reaching from one bank to the other; but when the width of the stream renders this impossible, and several planks in length are necessary, the question arises how these planks are to be supported above the surface of the water. It is for the purpose of supplying these supports that a regular army is provided with *pontoons*, which will be better understood if we speak first of more rude and simple arrangements. Sir Howard Douglas says, that when he was with the Peninsular army, he was prepared to adopt a plan of crossing rivers by forming a bridge in which the planks were supported by *inflated skin bags*, whose buoyancy kept up the superstructure. In Spain, bags made of animal skins are commonly used for containing wine: and such bags, inflated with air, have been found to possess the requisite buoyancy. A light frame-work of planks is formed, and placed on a row of such bags, the sides of the frame descending at the edge to enclose the bags; and unless the latter become perforated by musket-shots, they still retain their buoyancy for a sufficient length of time to allow of a passage across the stream. Sir Howard Douglas states that where an army is provided with fresh meat, the hides of the slaughtered animals may be used for this purpose; and he details an experiment made on the buoyancy of an ox-hide weighing nearly fifty pounds. It was trimmed into a circular form, about five feet and a half in diameter, drawn together at the edge, and firmly bound round a tube made of alder-wood, having the pith removed, and a piece of leather nailed upon the inner end, as a valve to prevent the air from escaping. The vessel was then inflated by a common hand-bel-

lows, and acquired a buoyancy which enabled it to bear, in the water, a weight of three hundred pounds for fi · hours, and even to bear half that weight for a period of twenty-four hours, although the hide was not covered with any composition to close the pores.

It has been proposed in France to employ, as a support for the framework of a temporary bridge, canvas bags coated with a solution of India-rubber. The bags used experimentally were of an elliptical shape, six feet long, two feet wide in the centre, and two feet deep. The upper surface was fastened to a frame rather longer and wider than the bag, with sides a few inches high, forming consequently a light shallow case, in which the bags might be packed for travelling. To inflate the bag, two or three men, standing on planks attached to the lower surface of the bag, lifted the frame, by which the bag became stretched, and air rushed in through a cock or spigot, which was afterwards closed; and in this way the bag was filled with air in a few seconds, without the aid of bellows. The bags are of course intended, by their buoyancy in water, to support the planks for a temporary bridge. Thévenot describes a similar contrivance as being in use to cross the Tigris, and even to travel down that river. The whole structure is called a *kalee*, and is formed thus:—the kalee is composed of twenty rows of inflated bags, each row formed of thirteen bags lashed to a pole. Over these, placed about two feet and a half apart, the floor is laid, forming a platform twenty-four feet by eighteen; and on this platform the merchandise, &c. is placed.

Air-tight cases, made of more durable materials than skin or canvas, have been more or less used as the floating support of temporary bridges. A German engineer of the last century constructed a bridge in the following manner:—he formed air-tight cases of light planks, each case being five feet long, one foot broad, and one deep. The cases were divided into four compartments each, by interior partitions, for the double purpose of preventing one leak from filling a whole case, and of giving it strength to resist the outward pressure. Four of these cases lashed together side by side formed a raft, weighing about three hundred pounds, and capable of sustaining a frame of boarding at the top. To make a bridge of such rafts for infantry, one of the rafts was placed in the water, and pushed off to make room for a second, which was then launched, and connected with the first by the framing of the two being clamped together. Both rafts, so connected, were then pushed onwards, to give place to the next, and so on till the whole line of communication was formed. The rafts were kept steady from the movement of the current by a rope stretched across the stream from bank to bank. Infantry marching in single file were capable of passing along such a bridge. Twenty of such cases, forming a raft measuring twenty feet by five, would form one element of a bridge sufficiently strong for the passage of cavalry.

Empty casks have often been used as the buoyant supporters of a temporary bridge. The Russians, in their wars against the Turks and Tartars, have always been obliged to carry across the deserts supplies of water sufficient for several days' consumption: and the casks, after having served for this purpose, have been generally reserved for constructing rafts and bridges. In such cases each company took with it a large barrel of water for its own use; and in order to make the empty vessels available for the purposes of a bridge, eight or ten planks are likewise carried by the men of each company, in turn. Nine casks, each two feet long by two and a half diameter in the largest part, supporting a frame-work of timber nine feet long, is calculated, when the floated casks are filled with air and well corked, to bear a weigh of nearly four thousand pounds; and a bridge of such rafts would bear cavalry in single or infantry in double file.

Sometimes boats, casks, air-tight cases, and bags are all equally beyond the reach of an army, or are not fitted for the object in view, when the troops are about to cross a river. In such case a continuous raft of timber is sometimes constructed, reaching from bank to bank; and if trees are scarce, wood is procured by that sort of military licence which the events of war so often illustrate. Sir H. Douglas, in his work on 'Military Bridges,' gives a remarkable instance of this kind in connection with the Duke of Wellington's campaigns in the Peninsula. When, in July, 1809, the British head-quarters were at Placentia, it became necessary to secure the means by which a junction might be formed with Cuesta; and two companies were accordingly ordered to construct a raft-bridge over the river Tietar at Baragona. The officer to whom the execution of this duty was committed could find no materials for his bridge, except the timber of a large inn and its outhouses, about a mile and a half distant, and some pine-trees that grew in a neighbouring wood. The inn was thereupon unroofed, and all the available timbers appropriated, including six large beams of dry fir, three or four hundred rafters, six doors, and the mangers from the stable. With the large beams was formed a raft, measuring twenty feet by twelve, capable of supporting a flooring (made of the planks of the mangers) thirty feet in length. This raft occupied the deepest part of the river, and was connected with either bank by a flooring of the door and mangers, supported by piles driven into the shallow bed of the river. A strong rope, stretched across the river, and secured at each end, kept the raft in its place. On the singular raft-bridge thus constructed, the whole British force crossed the river on the 18th of July.

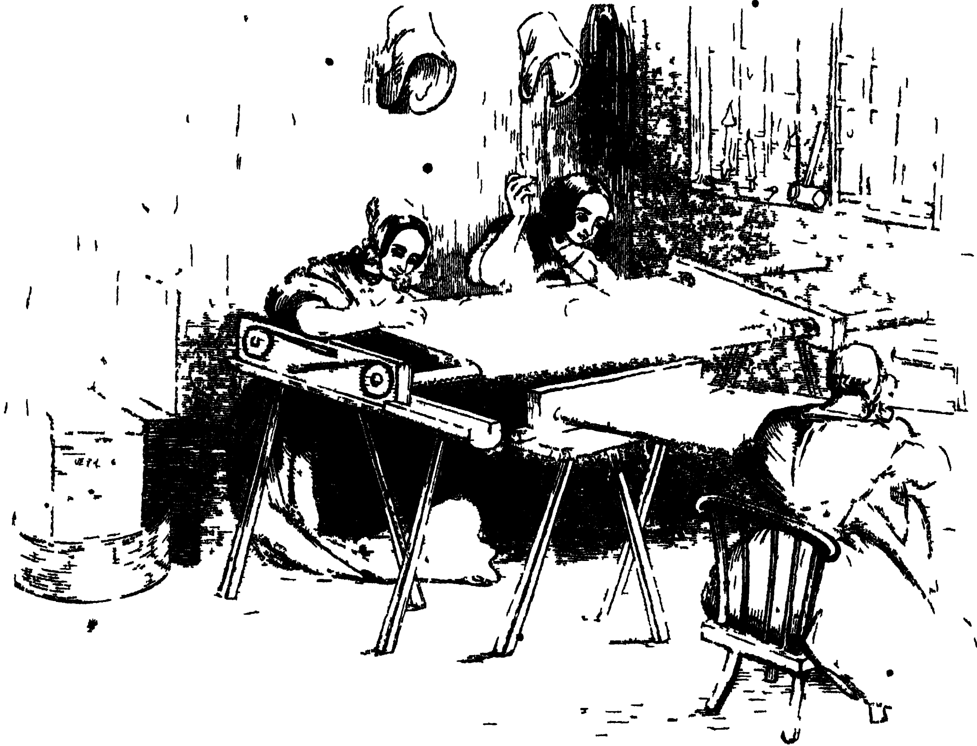
On another but similar occasion, when a British force wanted to cross the river Alviella, in pursuit of Marshal Ney's force, they pulled down an oil-mill to furnish beams for a raft, and used the doors of the houses and the materials of the corn-chests (which in Portugal are very large) for planking: with these materials a communication was speedily restored in a very ingenious manner, though neither nails nor tools could be procured.

A "bridge of boats" is a medium of communication much more frequently adopted in military manœuvres than any of the preceding, when the facilities for its formation are at hand. In such a case, when a river is about to be crossed, all the boats are seized from the neighbouring banks, and applied to immediate service. The boats are ranged side by side, or at least parallel, with head and stern in the direction of the river's course, so as to present their sides towards the banks. Boats as nearly of one size as possible are placed next to each other, in order to maintain an uniform level. An interval is left between every two boats, and planks are laid across from boat to boat, the planks and the boats being so secured as to make a roadway sufficiently firm for an army. Bridges of boats have been in this way constructed of enormous dimensions. It is recorded that in 1739, when a Russian army was about to cross the Dnieper, an inundation had caused the river to overflow the adjacent country to a width of two leagues; nevertheless the Russians formed a bridge of boats across the entire breadth.

In France *bateaux*, or flat-bottomed boats, are sometimes provided, to be carried with the army to the place where a river is to be crossed, and there used, instead of depending on the uncertainty of finding a supply of boats on hand.

[To be continued.]

A DAY AT THE NOTTINGHAM LACE-MANUFACTORIES.



[Lace-runners, or Embroiderers at Work.]

If the fair ladies who wear veils, 'cardinal capes,' scarfs, collars, borders, quillings, and edgings of British lace could know the vast amount of inventive skill, of complicated machinery, and of patient endurance involved in the production of these articles, they would see how largely the well-being of thousands depends on the fluctuations of 'fashion,' and would perhaps marvel how such fabrics could be sold at such a price as the modern market indicates.

We shall perhaps be correct in saying that those who from their sex and the form of their attire, have most concern with lace as a material for ornamental dress, are seldom in a condition to decide whether lace is in our own day made by machinery or by hand, or how far the two are combined. And there is good reason why this may be the case; for almost every year presents some new adaptation of mechanism, some new order of processes, by which a pattern is produced that could before only result from the needle of the embroiderer. In some cases the imitation is so exact, that a close inspection is necessary to determine the mode of production; while in others the machine produces a new pattern altogether, rather than an imitation of an old one worked by hand.

But before we conduct the reader to the busy lace-making world of Nottingham, where bobbin-net lace may be said to form the staple product, it will be necessary to pay a little attention to that which was formerly called *lace*, when no such article as bobbin-net had yet been heard of. The connection between it and the modern manufacture is in every way remarkable.

The real lace, such as was worn by the dowagers of the last century, is formed principally of *flax* thread, and is wholly worked by hand, not only in the decorative parts, but in the mesh-work ground itself. The bobbin-net of modern times is made of *cotton* thread; the meshes being made wholly by machinery, and the figured device (if any) being effected sometimes by the same machine and at the same time as the ground, and sometimes by a kind of embroidery or tambour work. The silk net, such as the material of which black veils are sometimes made, is, as its name imports, made of *silk* thread, and is formed by machinery very nearly on the same principle as bobbin-net.

At what period and in what country this elegant material was originally first wrought for dress cannot perhaps be easily determined. It has been supposed that Mary de' Medici was the first who brought lace into France from Venice, where, and in the neighbouring states of Italy, lace seems to have been long previously worn. It is recorded that lace-making was introduced into this country by some refugees from Flanders, who settled near Cranfield, now a village on the west side of Bedfordshire, and adjoining Buckinghamshire; and it has been supposed that the first kind so made in England was that which is called *Brussels point*, the net-work being made by bone bobbins on a pillow, and the pattern and sprigs being worked with the needle.

The working of hand-made or 'pillow lace' may be thus briefly described.—The lace-maker sits on a stool or chair, and places a hard cushion on her lap. The desired pattern is sketched upon a piece of parchment, which is then laid down upon the cushion, and she in-

serts a number of pins through the parchment into the cushion, in places determined by the pattern. She is also provided with a number of small bobbins, on which threads are wound: fine thread being used for making the meshes or net, and a coarser kind, called *gimp* or *gymp*, for working the device. The work is begun at the upper part of the cushion by tying together the threads in pairs, and each pair is attached to one of the pins thrust through the cushion. The threads are then twisted one round another in various ways, according to the pattern, the bobbins serving as handles as well as for a store of material, and the pins serving as knots or fixed points, or centres, round which the threads may be twisted. The pins inserted in the cushion at the commencement are merely to hold the threads; but as each little mesh is made in the progress of the working, other pins are inserted, to prevent the threads from untwisting; and the device on the parchment shows where these insertions are to occur.

Such is the simple principle, modified according to the pattern about to be produced, on which 'pillow-lace' is made; and it is astonishing how many females have been dependent for their subsistence on this occupation. Throughout the midland counties, especially Bedford, Buckingham, and Northampton, almost every town and village exhibits this domestic branch of manufacture; but so greatly has it suffered by the competition of the Nottingham lace, that it would perhaps be difficult now to say what is the number of persons thus employed. In a petition presented to Queen Adelaide in 1830, it was stated that a hundred and twenty thousand persons were dependent on the pillow-lace manufacture, and were reduced to an extremely low rate of earnings; but it is supposed that the number has been since then greatly reduced. Mr. Slater (in M'Culloch's 'Commercial Dictionary'), after speaking of an improved pattern of pillow-lace introduced about the year 1800, says, "From that time to 1812, the improvement and consequent success were astonishing and unprecedented. At Honiton in Devonshire, the manufacture had arrived at that perfection, was so tasteful in the design, and so delicate and beautiful in the workmanship, as not to be excelled even by the best specimens of Brussels lace. During the late war veils of this lace were sold in London at from twenty to a hundred guineas: they are now (1831) sold at from eight to fifteen guineas. The effects of the competition of machinery, however, were about this time felt; and in 1815 the broad laces began to be superseded by the new manufacture. The pillow-lace trade has since been gradually dwindling into insignificance."

Here then we come to the point of connection between pillow-lace and machine-lace: we see that the former thirty or forty years back from the present time was in its zenith; and we have now to watch the steps whereby that system was produced which has exhibited such wonderful results at Nottingham.

Nottingham is the centre of the cotton hosiery district, as Leicester is of the worsted hosiery, and Derby of the silk. In all three varieties, the weaving (if it may be so termed) of the stockings is effected through the instrumentality of the 'stocking-frame,' one of the most singular machines belonging to our textile manufactures; and it was through the medium of this frame that machinery first became applied to the making of a material which should imitate lace. A stocking, it would be seen by a little examination, is formed by a series of loops, in which a long and continuous thread is passed successively through loops or eyes into which it is temporarily thrown; whereas lace, whether made on the pillow or by machinery, results from a twisting of one thread round another.

It is said to have been about the year 1770 that one Hammond, a frame-work knitter (which is the technical name for a stocking-maker) at Nottingham, while looking at a piece of pillow-lace in his wife's cap, bethought him of trying whether he could imitate it by a modified action of his stocking-frame. With what degree of success the attempt was followed is not clearly stated; but in all probability it was more instrumental in spurring on the ingenuity of others than in effecting the immediate object desired. From that time Nottingham and its vicinity became a scene of remarkable bustle and ingenuity; numerous frame-work knitters being led, by the hope of pecuniary advantage, to study and improve the capabilities of their hosiery-frames. By degrees the retail shops exhibited specimens of machine-made lace, so much cheaper than that made by hand, as to give rise to a progressively increased demand; and Nottingham became the nucleus of an entirely new branch of manufacture.

The great improvement, however, which gave to the new branch of industry its most extraordinary impulse, resulted from the inventive ingenuity of Mr. Heathcoat. This gentleman constructed a machine, which, from certain arrangements of its parts, was called a 'bobbin frame' or machine; and hence has resulted the term 'bobbin-net.' But Mr. Heathcoat, like many other ingenious men who have introduced improvements in manufactures (among whom Jacquard furnishes a notable instance), was treated roughly for his pains by some of the workmen; and he transferred his capital and skill to Devonshire, where the bobbin-net manufacture soon attained a high degree of importance.

Mr. Heathcoat, having obtained a patent for his important improvements about the year 1809, retained the use of it in a great measure in his own hands till about the year 1823; when, the patent expiring, the manufacture was taken up with an extraordinary degree of activity by many persons at Nottingham. "A temporary prosperity," says Mr. M'Culloch, "shone upon the trade; and numerous individuals—clergymen, lawyers, doctors, and others—readily embarked capital in so tempting a speculation. Prices fell in proportion as production increased; but the demand was immense; and the Nottingham lace-frame became the organ of general supply, rivalling and supplanting, in plain nets, the most finished productions of France and the Netherlands." The earnings of workmen were quite extraordinary. The inhabitants of Nottingham look back to that period as to a sort of golden age, never equalled before or since, when men could earn wages such as would startle those unacquainted with the matter. Dr. Ure remarks, that "it was no uncommon thing for an artisan to leave his usual calling, and, betaking himself to a lace-frame, of which he was part proprietor, realize by working upon it 20*s.*, 30*s.*, nay even 40*s.* per day. In consequence of such wonderful gains, Nottingham, the birthplace of this new art, with Loughborough, and the adjoining villages, became the scene of an epidemic mania. Many, though nearly devoid of mechanical genius or the constructive talent, tormented themselves night and day with projects of bobbins, pushers, lockers, point-bars, and needles of every various form, till their minds got permanently bewildered. Several lost their senses altogether; and some, after cherishing visions of wealth, as in the old time of alchemy, finding their schemes abortive, sank into despair, and committed suicide."

By degrees the furor subsided, and the bobbin-net manufacture took its place among those which are of national importance, but not pre-eminent for lucrative returns. Competition and superabundant supply, as usual, brought this about. Various manufacturers and machinists, among whom are Mr. Morley and Mr. Leavers, have from time to time introduced improvements and modifications of the machine; and steam-

power which was first applied to this manufacture in 1816, became gradually adopted more and more, till the most extraordinary changes have resulted in the prices of the finished articles. It has been stated that lace, which was sold by Mr. Heathcoat for five guineas a yard soon after the taking out of his patent, can now be equalled at eighteenpence a yard; that quillings as made by a newly constructed machine in 1810 and sold at four shillings and sixpence a yard, can now be not only equalled but excelled for three halfpence a yard; and that a certain width of net which brought seventeen pounds per piece twenty years ago is now sold for seven shillings! There are but few other branches of our manufactures in which equal vicissitudes have occurred in the same space of time.

The reader will by this time have had ample means for judging how it is that machine-made lace has done so much towards extinguishing the old pillow lace; and will be prepared to accompany us in a brief notice of the manufacture.

From the mode in which the lace manufacture is subdivided at Nottingham, any notice of one single factory would fail to convey an idea of the general system pursued, because links would be wanting in the chain of processes. For this reason we have thought it better, instead of confining ourselves to the general arrangements of one large factory, to consider the whole town as a collective lace manufacturing community, and to follow a piece of lace from house to house, and from factory to factory, till it is presented to us in a finished form. Several manufacturers, some of whose names we shall have to mention, have kindly furnished the facilities for this object.

In the first place, then, the cotton thread is procured from the Manchester districts. There are probably a few cotton-mills at hand, but the main bulk of the material employed is furnished by the great Lancashire and Cheshire firms. We do not know whether flax thread is ever now used for machine-made lace; but cotton forms the great staple, and to this we may confine our attention. The cotton-yarn agents are perhaps the first parties in the chain of operations at Nottingham to whom it may be necessary to refer. They come between the Manchester spinner and the Nottingham manufacturer, effecting sales of cotton thread or yarn from the former to the latter. These agents are in some cases lace-agents also, and effect sales of the manufactured articles; indeed they occasionally receive a portion of the finished lace as payment for the thread supplied.

Then comes the 'manufacturer.' A bobbin-net machine is so complex and so costly, that, unlike a common loom, the actual workman can seldom possess one of his own; he must be indebted to another man who possesses capital for his working implements. In some cases the capitalist has a large building containing all the requirements and resources of a regular factory, and where the machines are generally worked by steam-power. In other cases he may have a large number of machines, but instead of working them on his own premises, he lets them out at so much a day to middle-men called 'machine-holders.' These machine-holders intervene between the machine-owners and the workmen, much in the same way as a house-holder supplies a link between the house-owner and the lodger: he pays rent to the owner, and receives it back, with a profit, from those who occupy a subordinate position to himself. In such cases as these the machines are worked by hand-power, since steam-power only becomes available in a tolerably large building.

Mr. Drinkwater, one of the Factory Commissioners, who visited Nottingham for the purposes of the Commission in 1833, after giving a list of the machine-owners, says:—"It will be seen by this list that a very large proportion of them are proprietors of a single machine; in this case the owner generally works it himself, and so far partakes of the character of master and journeyman. It is not uncommon to find one of these costly machines, which may have occasioned an outlay of 500*l.* to 1000*l.*, within a house but little removed above the degree of a cottage; but for the most part they are worked in the attics and upper stories of substantial houses, the lower parts of which are occupied as shops or lodging-houses. The centre of the town is not much filled with them, but in all the approaches and in the back streets, as well as in the better houses of the lower town, the incessant thumping of the machines is heard."

As an example of a factory on a considerable scale, we may mention one which we visited in the vicinity of Nottingham, in the possession of a Mr. Burton. The lace manufacture is carried on not only *in* Nottingham, but throughout a circle of wide radius, of which that town is the centre. About two miles north of the town, on the road to Mansfield and Worksop, is a pretty little village called Carrington, many of the inhabitants of which are employed in this factory. The factory presents to view a double pile of buildings, exhibiting long ranges of windows, story after story, to a considerable height, and surmounted by the usual pinnacle of a factory, viz. a chimney. The entrance and the staircases occupy a middle compartment between the two ranges of building.

On entering some of the stories of the factory, the effect to a stranger is most deafening, for the lace-making machine is anything but a silent worker. Some of the stories of the building are filled with the machines making broad net several yards wide, or narrower net for quillings. Some are occupied by winders, winding the yarn on the very remarkable bobbins employed in the manufacture. Some are devoted to processes subsequent to the actual formation of the net, but preparative to the sale of the commodity. In the lower part of the factory are smiths and engineers' shops, where the machines are partially made and wholly adjusted to working order. In a court-yard in front of the factory is an appendage which may at first seem rather remarkable, viz. a *gas-house*. The factory being a mile or two from Nottingham renders a supply of gas from thence a serious affair, while the system on which the factory is conducted renders necessary a large amount of night work. The machinery is kept at work for twenty hours out of the twenty-four, two complete sets of workpeople being engaged; and thus a supply of artificial light is required for a great number of hours. It is to furnish this, and in sufficient quantity, that the gas-works, with the necessary apparatus of retorts, purifiers, gasometer, &c., have been constructed within the establishment.

At the factory here described various kinds of net and lace, both plain and figured, are made. At another establishment which we visited in Nottingham, viz. that of Mr. Beck, the machines are employed in the production of fancy net alone, that is, such as are intended to imitate the productions of hand labour, both in the form of wide pieces and in that of narrow quillings and borders. In a third establishment, the property of Mr. Cleaver, we found the machines wholly employed in making silk edgings, a great many widths being made at one time, and then separated by drawing out threads from between them; and some of the machines able to produce ten thousand yards of silk edging per week.

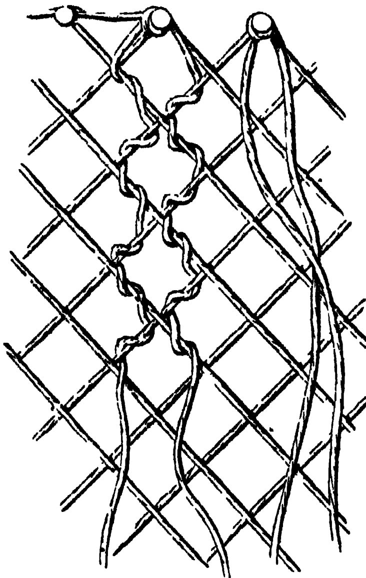
So it is throughout Nottingham and its vicinity. Some manufacturers undertake the fabrication of one kind of net or lace, and some another; but there is a general similarity of proceeding throughout, both in the mode in which the machines act, and in the pre-

paratory and finishing processes to which the lace is subjected.

The reader may now very naturally be desirous of knowing what kind of a machine it is that produces such remarkable results. Here we have to state at once that a thorough comprehension of its action can scarcely by any possibility be acquired from a written description, unless accompanied by a large series of illustrative engravings, and studied closely by those who are accustomed to investigate the action of machinery. This is, of course, quite beyond our present purpose, which relates only to a slight exposition of the general principles involved.

Let us ask, then, what is it that the machine has to perform? It has to entwine threads one around another in such a way as to form meshes or holes, bounded by a circular, a square, a hexagonal, or an octagonal margin, according to the pattern. We may make the following supposition:—Let a number of strings be suspended from the ceiling of a room in pairs, so that when the two strings of each pair are twisted round each other by hand, they may form half as many ropes as there were strings. We will further suppose, that after two or three turns of one string round another, each string is twisted once round one string of an *adjoining* pair, and then returned again to its former companion. By this arrangement, each rope would become linked to the adjoining ropes on either side, and the whole would form a kind of net-work, presenting holes or meshes bearing some analogy to those of net-lace.

Or we may represent it pictorially, thus:—Here we

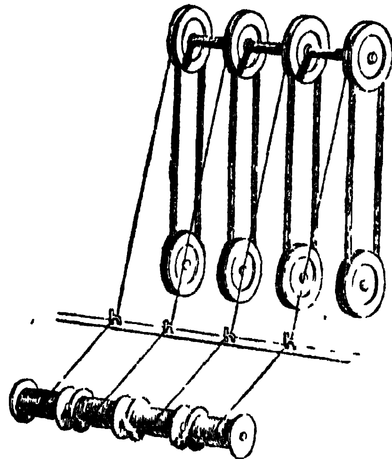


[Strings twisted in the manner of the bobbin-net.]

have a small number of strings, fixed at one end; and each string has to be passed diagonally round and between the others, so as to form knots, links, loops, or whatever fastenings they may seem most to resemble. The reader, perhaps, could hardly bring the matter home to his own mind more clearly than by selecting a few threads of different colours, fastening them at one end, and twisting them round one another in a certain definite and pre-arranged order: he would find that the meshes produced would bear some slight resemblance to different kinds of net, according to the manner and the order in which the successive threads were brought into the twist.

Now it is to effect such convolutions as these that the machine is employed; and there is certainly much to call for admiration in the successful adaptation of parts to this end. In common weaving, it is well known that the cross threads pass at right angles over and under the long thread, passing over and under each thread alternately, if it be to form a plain material, or passing over several threads consecutively and under one, if it be to form a twill. But in the production of net this crossing is at the same time accompanied by a twist, so that one thread passes completely round another.

Annexed is a representation of part of a winding-engine; to which succeeds another cut portraying



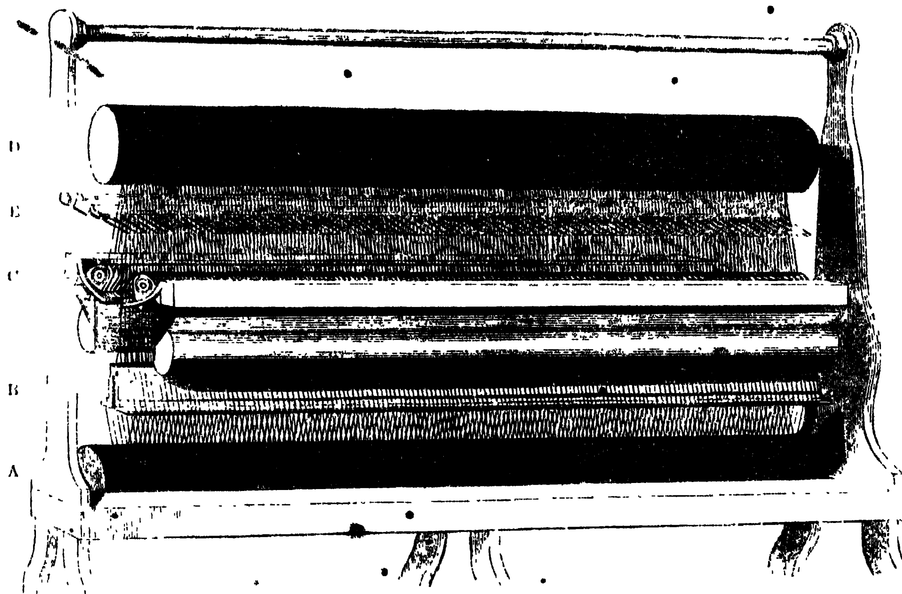
[Winding Engine.]

the essential parts of one kind of bobbin-net machine. The former winds the cotton for the latter, and is represented here to show how the cotton leaves the form of *skeins*, and is wound on a bobbin or reel.

The net-machines are infinitely more complex. There are several kinds employed by the Nottingham manufacturers, and known by the names of the 'circular-bolt machine,' the 'lever-machine,' &c., according to certain peculiarities in the mode of action; but one of these, viz. the 'circular bolt,' which is more used than any of the others, will be sufficient for our purpose. It so far bears an analogy to a common loom that there are warp-threads stretched in a parallel layer, and weft-threads wound on bobbins which pass between the warp-threads; but beyond this point the analogy is very slight indeed. In common weaving, the warp-threads lie horizontal; here they are vertical. In the former case, the bobbins are only few in number; in the latter they amount to hundreds, and even thousands. In the former the bobbin passes between and among the warp-threads in the direction of the plane in which the warp lies; in the latter it passes at right angles to that direction. In the former there is only one weft-thread, or one bobbin or shuttle, to many thousand warp-threads; in the latter, there are as many separate weft-threads and bobbins as there are warp-threads.

When we thus speak of 'bobbins' in reference to common weaving, we depart a little from common nomenclature; for the name of 'shuttle' is given to the little machine which carries the weft-thread: but the analogy of principle is observable, independent of the technical terms employed. The shuttle, in common weaving, is a kind of little boat, containing the weft-thread, wound upon a pirn or axis. But the bobbin of a net-machine is a most remarkable contrivance. The whole apparatus, including the bobbin on which the cotton weft-thread is wound, and the carriage or frame

in which it is placed, is not thicker than the diameter of the meshes in the net to be made. Very frequently the thickness is not more than one-thirtieth of an inch! The bobbin consists of two thin disks of brass, about an inch and a half in diameter, laid face to face with a slight intervening space; and in this minute space the thread is wound, in quantity about fifty or sixty yards to each bobbin. The bobbin is then fitted into a kind of carriage, which conveys it between the threads of the warp, and at the same time allows the thread to be un-



[Essential parts of the Bobbin-net Machine.]

(The warp, ascending from the beam A, passes through small holes in a guide-bar B, and thence to the point C, where the bobbins in their respective combs, driven by the ledges on the two bars beneath, traverse the warp to and fro, and interlace the threads as shown at D; the points E acting to maintain the forms of the meshes.)

wound from the bobbin: in short, the carriage is to the bobbin what the little boat of a shuttle is to the pirn on which the weft-thread is wound.

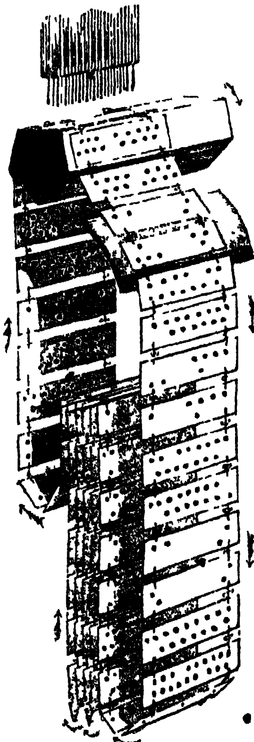
No less than three thousand six hundred of such bobbins as are here described are sometimes used in one machine! Many of the machines are twenty quarters wide—that is, fitted to the manufacture of net five yards in width; and have twenty of these bobbins to the inch. If the arrangements of the machine, as represented in the cut, be examined (the moving power being here wholly omitted), it will be seen that the warp-threads are wound on a beam in the lower part of the machine, from which they ascend to the upper part. The warp is divided into two parcels (somewhat in the same manner as the warp of a common loom by the action of the treadles), and each parcel is susceptible of a reciprocating motion, alternately to the right and left. The weft-threads, wound on the bobbins, are fastened each at one end to the upper part of the machine; and the bobbins are suspended so as to have a backward and forward motion between the warp-threads, like so many clock pendulums, being guided between the warp-threads by a very curious piece of apparatus called a 'comb.' The principle of action, then, is this:—After the bobbins have been driven between the respective warp-threads, the warp is shifted a little on one side, so that, when the bobbins return, they pass through openings different from those which they traversed in the first instance; and by this means the weft-thread, unwinding from each bobbin in the course of its movement, becomes twisted round one of the warp-threads. After this has been repeated two or three times, the comb which carries the bobbins is itself shifted to and fro laterally, by which the bobbins are brought opposite to openings between the warp-threads different from those to which they were before opposed. Herein lies the whole principle. According as the front layer of warp, or the hinder layer, or the comb carrying the bobbins, are shifted to and fro laterally, so does the weft-thread, as it becomes unwound from the bobbins, twist round the warp-threads during the passage of the bobbins across; a shifting, in one or other of several different ways, being effected immediately after each traverse of the bobbin. After a certain number of twistings have been effected, a series of points become inserted between the warp-threads, and temporarily hold up the knotted twists so as to form the meshes of the net.

It has been often said, and truly, that the bobbin-net machine is one of the most complicated which the ingenuity of man has ever devised; and it may therefore well be supposed that nothing more than the bare principle can be here exhibited. Perhaps it may assist the reader if we carry out our former supposition a little further. Let a series of strings be suspended from the ceiling in two rows, with their ends fastened to a horizontal bar; and let a number of small pendulums be suspended between the strings, and enabled to oscillate to and fro between them. Then, if after each traverse of the pendulums between the stretched threads, the rows, one or both, of threads be shifted a little on one side, so that the pendulums may return through openings different from those which they before traversed, we should have a system of movements somewhat analogous to those in the machine; and the strings by which the pendulums were suspended would be found to twist round the stretched vertical strings. If we further suppose that each row of strings is capable of being shifted independent of the other, and that the pendulum strings be fastened to a shifting-bar near the ceiling, we might imitate in a rough way the series of movements by which nét is made.

Not only is plain net made by these movements of the machine, but figured net also. In plain nets, all

the bobbins are moved similarly at one time; but in fancy nets, some are stationary, some pass between the warp-threads some are shifted laterally to the distance of one mesh, some to the distance of two or three meshes; some move to the right, some to the left; the warp-threads, too, instead of being divided into two parcels only, are divided into several, each of which is susceptible of the lateral movement independent of the others. It is by modifications of these lateral movements that all the numerous varieties of machine-made lace or net are produced; and if this fact be borne in mind, the principle of the machine becomes to a certain degree explicable. It is known to those who have witnessed weaving, that figured weaving results from a multiplication or extension of the same kind of movements as those whereby plain weaving is effected; and the same may be said of lace-making. It results from this, that a great portion of the complexity of the machine is due to the mechanism by which these lateral movements are produced: if the warp is divided into several parcels, each of which can be moved, either to the right or to the left, independently of the other parcels; and if the bobbins are similarly classed in several parcels, each of which shifts without reference to the others; it follows that an almost infinite variety of movements may be brought about; and it is not difficult to see that these movements must affect the manner in which the bobbin-threads twist round the warp-threads, and consequently affect the pattern produced.

It is by means of levers that the various parcels of warp and bobbin threads are shifted laterally, after each traverse of the bobbins; and the annexed cut shows one of the modern contrivances for governing the movements of the levers. This is an application of the Jacquard apparatus, which we saw at work in the establishment of Mr. Beck. Near the end of the bobbin-net machine is fixed the pentagonal bar here represented, each side of which is pierced with as many holes as there are pins or levers above, seen at the top of the cut. A number of oblong pieces of card, from two to five hundred, are connected together in an endless chain, and so arranged as to size, that when one of the cards is laid on one side of the pentagon, and the latter made to revolve, the whole series will be brought successively in contact with the pentagon, each one lying temporarily on the flat upper side. Every card is pierced with holes, varying in number and disposition according to the pattern of the lace to be produced, but never more in number than the pins or levers above; and these holes are so cut as to coincide exactly with those in the pentagon. Suppose, then, the pentagon to have an up and down motion, so as to be brought in contact with the pins, what would result? Wherever a hole occurs in the card, it permits the pin opposite to it to penetrate into the pentagon: but where a blank occurs, by the card not being perforated opposite to a particular pin, the pin cannot enter the pentagon, but is driven upwards. Now the warp and bobbin threads, and other apparatus of the machine, are so connected with these pins, that when one of the pins is driven upwards, some part of the thread apparatus is shifted laterally; and it hence follows that the disposition of the holes in the cards determines the order and number of the shiftings of the threads. It bears a strong analogy to the action of a barrel-organ or a musical snuff-box, where the number and disposition of the pins on the barrel determine the pipes and the springs which shall be sounded. The number of cards employed depends on the number of successive movements requisite to form one complete specimen of the pattern.



[Jacquard Apparatus.]

Whether the article be plain broad net, fancy broad net, sprigged net, plait net, wire-ground net, quilling net, or edging, the movements of the machine by which it is made depend pretty much on the same principles, and may therefore all be alluded to in connection. But in noticing the subsequent processes, it will be desirable to take some one kind as a standard; and for this purpose it will be well to select a specimen of 'piece-goods,' such as a collar or a cape, in which all the figures are worked by hand on a piece of plain net.

After a piece of plain net has left the machine, it undergoes the process of 'gassing,' or singeing, for the removal of the hairy filaments from the cotton. There are some firms in Nottingham which confine their attention to this operation only. The gassing-machine is a very beautiful contrivance, in which the manufactured article is drawn between two rollers, and exposed, as it passes, to the action of a large number of minute blazes of gas, which remove the little adherent filaments without scorching or burning the net.

Supposing, as we do, the specimen to be a piece of plain net which is to be embroidered by hand, the net next receives a slight printing, with some coloured pigment, of the pattern which is to be worked upon it. There are in Nottingham a small number of artists (for so they are or ought to be) who design patterns for the lace-workers, and cut them out on wooden blocks, precisely as those for the floor-cloth manufacture. This is evidently an employment in which taste and a knowledge of the forms of natural objects are required; and it is satisfactory to find that a School of Design is about to be established at Nottingham, with the avowed object of elevating the taste and character of the lace-patterns produced. The lace is generally carried to the house of the 'designer and stamper,' who stamps the pattern very slightly on it. In the instance of a cape or collar, or any article of definite shape, the stamp gives the shape and size of the article, as well as the figures with which it is to be decorated.

When the stamper has imprinted on the net the outlines of the device, a 'pattern-setter' decides on the manner in which the pattern shall be filled up. For instance, if a leaf form part of the pattern, the stamper only gives the outline of the leaf, and it rests with the pattern-setter to determine how the needle of the embroideress shall fill up the device.

We next go to one of the humble homes of the numerous and lowly-paid 'lace-runners.' The term *embroidery* does not seem to be much used in connection with the Nottingham lace-trade, most of those who work on net with the needle being termed 'lace-runners.' Each workwoman has a frame, on which the net is stretched out horizontally, at a height of about three feet from the ground. She sits on a stool or chair, places her left hand under the stretched net, to keep it in a right position for working, and with her right hand

works the pattern with needle and thread in every part where the stamper has imprinted a device. The needle is inserted between and among the meshes of the net, and stitches of greater or less length taken, until there is a body of thread laid in sufficient to mark the device conspicuously. This working round of the outline is called 'running,' while the filling-up of the interior parts is termed either 'fining' or 'open-working,' according as the original meshes of the net are brought to a smaller or a larger size by the action of the needle. How, by the work of the needle, the meshes of the net may be made larger or smaller, will be easily comprehended by the one sex, and must be taken for granted by the other.

It is sad work to see how continuously these poor females must labour before they can earn a small pittance. Little do those who see in the attractive shop-windows of London the beautiful veils and capes which Nottingham now produces, imagine how many aching fingers and eyes, and perhaps hearts, have been concerned in their production. We believe it to be pretty nearly correct to say that at the present time the earnings of the lace-runners do not, on an average, much exceed a half-penny an hour; for the weekly earnings for long days' work are not much above three shillings, and are frequently below it.

The mode in which this embroidery business is transacted is often thus:—A person takes from a manufacturer as much work as twenty, or perhaps fifty, females can embroider; and she devotes as many rooms as her house can afford to the reception of the workers, who pay to her a trifling sum out of their trifling earnings) for the use of the room. Our frontispiece, for example, was taken in a garret or attic in a house in an humble neighbourhood, in which seven or eight young women were at work, in the same manner as the three represented in the cut. They all received their work from the woman who rented the house, who paid them for their labour, deducting a rent for the frame-room, and, we believe, a further trifle for some other item. To eke out their earnings, the women in one room often have their meals in common, making up, for a few pence, a hash or stew sufficient to dine seven or eight. There they sit, for twelve or fourteen hours a day, with the head stooping over their work, plying the needle, and driving off dull thoughts as well as they may by singing (for there is said to be much singing among the Nottingham work-people). It is not unfrequent for them to say—"If the great ladies of London knew how much work we have to do to their veils and capes for a shilling, they would pay better." But, poor things, these embroiderers do not know how complex, in such a country as England, are the circumstances which regulate the wages of labour: they would perhaps find that in reality the "great ladies of London" have but little influence on the rate of the seamstresses' earnings.

Some of the articles in lace are decorated by 'tambouring' instead of 'lace-running.' This is done in frames similar to the others, and by females in a similar rank of life; but a very small hook is used instead of a needle, by which a thread is wound as a kind of chain about and among the threads of the net.

After the lace-runners have worked the collar, cape, veil, or other net-lace article, it is taken back to the manufacturer, who then employs 'lace-menders' to examine every piece, and mend, with needle and thread, every defective mesh in the net, whether produced in the machine or by any subsequent accident. This is done so skilfully, and the form of the mesh so closely imitated, that the mended part can scarcely be detected except by a practised eye. The females engaged at 'lace-mending' earn much higher wages than the lace-runners, on account of the greater skill required.

The bleaching is an important part of the net manufacture, and is carried on by several firms in the neighbourhood of Nottingham. The net, after going through the greater part of the processes, has acquired a tint nearly as dark as brown holland; and it is the office of the bleacher to give it the snowy whiteness which adds so much to the beauty of the material. This bleaching is effected by a series of processes, such as scouring, exposure to the action of bleaching liquid, drying, &c. At one bleaching establishment near Nottingham, that of Messrs. Manlove and Alliott, we witnessed a most remarkable mode of drying the net after bleaching, recently patented, we believe, by these gentlemen. Usually the bleached article is wrung or pressed, and then hung up in a hot room to dry; but in this new mode the net is wrapped round in a kind of coil, between two concentric copper cylinders, the outer one of which is perforated with holes. The apparatus is then made to rotate with extraordinary velocity, so great even as a thousand times in a minute; and the centrifugal force thus engendered drives out the water from the damp net through the holes in the cylinder, thus leaving the material nearly dry. It is expected that this invention will introduce important improvements in bleaching and analogous processes.

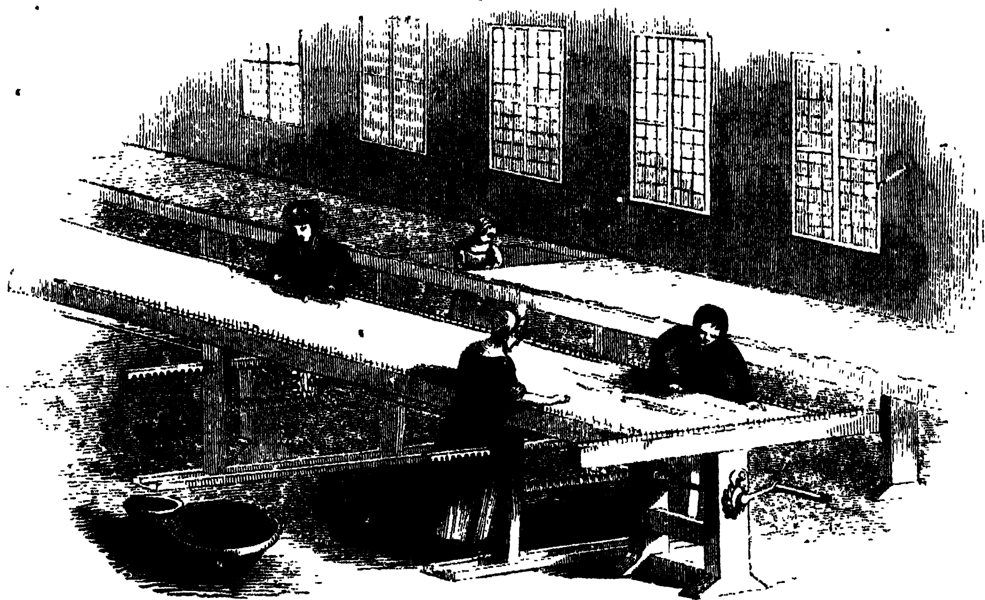
If the net or lace is to be black, instead of white, it is dyed instead of bleached.

After being again examined to see whether any further mending is required, the net next goes to be 'dressed,' and this takes us to the work-rooms of another class of persons. The 'lace-dressing rooms' of Nottingham are sometimes two hundred feet in length, and furnished as in the annexed cut. Long frames extend from end to end of the shop, capable of being adjusted to any width by a screw, and provided with a row of pins round the edge. The net or lace is first dipped in a mixture of gum, paste, and water, wrung out, and stretched upon the frame by means of the pins or studs. While on the frame it is rubbed well with flannels, to equalize the action of the stiffening material in different parts, and then left to dry in a warm room. It is to the nature of the solution used that the different kinds of net and lace owe their different degrees of stiffness.

If the manufactured article be a cape, a collar, or a veil, it is not till the present stage in the proceedings that it is cut from the piece. The stamping, the embroidering, the gassing, the bleaching, the dressing —all are done while the piece is yet whole, several yards in length; but when it approaches thus far towards completion, the material is cut up, according to the size and shape given by the stamp, and a 'pearl edge,' or something similar, is sewn on by hand round every edge.

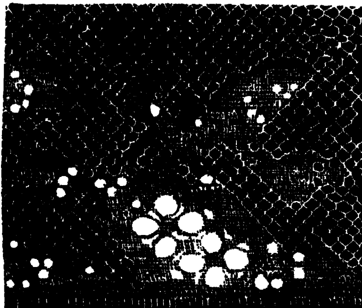
After a process of rolling, pressing, ticketing, &c., the article is finished.

The kind of article which we have selected as a specimen or standard comprises within the range of its manufacture nearly all the processes involved in the other branches of the lace-trade; and will therefore serve to give an idea of them all. As regards the question, to what degree hand-labour is employed upon the different varieties, the following will be a kind of summing-up. In a plain net the whole fabric is made at the machine. In sprigged net, the groundwork and a portion of every sprig are made at the machine, and the outline of every sprig is then worked by hand. In fancy broad-net the device as well as the groundwork are made at the machine. In plait-net the same thing is observable, and also in tatting-net. In edging and lace for borders the device is now very generally worked by the machine, but in some varieties it is partly put in by hand. In 'piece-goods,' such as capes, collars, and veils, the device is almost wholly worked by hand, a very small proportion being effected



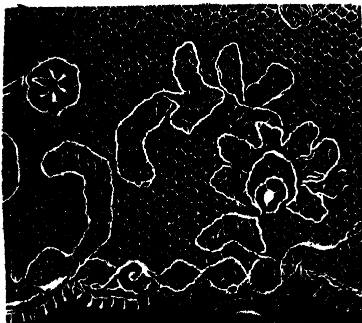
[View in a Lace-Dressing Room.]

by the Jacquard appendage to the lace-machine. As an exemplification of the manner in which the machine and the hand imitate each other's productions, we annex representations of two specimens, one of which (*a*) was



[Specimen of Machine Lace.]

wholly worked at the machine, and the other (*b*) wholly figured by hand on a machine-made net, excepting the



[Specimen of Run Lace.]

pearl edge,' which, after being made at the machine, was sewn-on by hand.

We stated, in a former part of the article, that the machine-holder, whether owner or not, buys thread from the Manchester cotton-spinner, and then works it up into net or lace. He does not do anything further to the material, but sells it at once, either to other manufacturers, or to agents and dealers. These other manufacturers carry the material through all the subsequent operations, employing and paying for the services of the gassers, the bleachers, the dyers, the dressers, the stampers, the menders, and the embroiderers. Some of these manufacturers only undertake the finishing of the plain goods, while others confine themselves to the fancy or embroidery department. One of these latter, Mr. Hickling, to whose kindness we have been much indebted, has been instrumental in the introduction of the Nottingham 'cardinal capes' of modern lady-costume; while other firms have taken up some other department in particular. Some are 'cap-manufacturers;' that is, they procure the lace from the machine-workers, dress and finish it, cut it up, and employ a number of women to make it into caps. Lastly, agents, sent by the great wholesale houses from London and elsewhere, visit Nottingham periodically, and make their purchases in lace and net; for Nottingham is the market for this commodity, whether made there or elsewhere.

Such, then, is a very brief sketch of a manufacture which may be said to have had no existence in the beginning of the present century, and of which Mr. Felkin (the greatest authority in all matters relating to the bobbin-net trade) made the following estimate in 1831: he calculated that the capital employed in Manchester in spinning thread for the bobbin-net manufacturers amounted to nearly a million sterling; and that the capital employed by the latter in various ways exceeded two millions sterling; that the number of persons employed in spinning, making, winding, embroidering, mending, &c. for the bobbin-net work, amounted to more than two hundred thousand; that the raw material (cotton and silk) used was worth about 150,000*l*. annually, in the state as imported; that this value was increased to 540,000*l*. when spun into thread; and that the final value, when manufactured into net, and ready for sale, was nearly two millions sterling per annum, or, including the wages of the embroiderers employed in different parts of England, more than three millions sterling! These results are certainly extraordinary, and could have been but little anticipated by the inventors of the machine, sanguine as they might be.



[John preaching in the Wilderness.—From a portion of a picture by Giotto.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. V.

Giotto and his Scholars.

Before we say anything of the personal characteristics of Giotto, we must return for a moment to that revolution in art which originated with him—which seized at once on all imaginations, all sympathies; which Dante, Boccaccio, and Petrarch have all commemorated in immortal verse or as immortal prose; which, during a whole century, filled Italy and Sicily with disciples formed in the same school and penetrated with the same ideas. All that had been done in painting before Giotto resolved itself into the imitation of certain existing models, their improvement to a certain point in style of execution: there was no new method; the Greekish types were everywhere seen, more or less modified—a Madonna in the middle, with a couple of lank saints or angels stuck on each side, holding symbols; or with their names written over their heads, and texts of scripture proceeding from their mouths; or at the most a few figures, placed in such a position relatively to each other as sufficed to make a story intelligible, and the arrangement generally traditional and arbitrary: such seems to have been the limit to which painting had advanced previous to 1280.

Giotto appeared; and almost from the beginning of his career he not only deviated from the practice of the older painters, but stood opposed to them. He not only improved—he changed; he placed himself on wholly new ground. He took up those principles which Nicola Pisano had applied to sculpture, and went to the same sources, to nature, and to those remains of pure antique art which showed him how to look at nature. His residence at Rome while yet young, and in all the first glowing development of his creative powers must have had an incalculable influence on his after-works. Deficient to the end of

his life in the knowledge of form, he was deficient in that kind of beauty which depends on form; but his feeling for grace and harmony in the airs of his heads and the arrangement of his groups was exquisite; and the longer he practised his art the more free and flowing became his lines. But, beyond grace and beyond beauty, he aimed at the expression of natural character and emotion, in order to render intelligible his newly-invented scenes of action and his religious allegories. A writer near his time speaks of it as something new and wonderful, that in Giotto's pictures "the personages who are in grief look melancholy, and those who are joyous look gay." For his heads he introduced a new type exactly reversing the Greek pattern: long-shaped, half-shut eyes; a long, straight nose; and a very short chin. The hands are rather delicately drawn, but he could not design the feet well, for which reason we generally find those of his men clothed in shoes or sandals wherever it is possible, and those of his women covered with flowing drapery. The management of his draperies is, indeed, particularly characteristic; distinguished by a certain lengthiness and narrowness in the folds, in which however there is much taste and simplicity, though in point of style as far from the antique as from the complicated meanness of the Byzantine models; and it is curious that this peculiar treatment of the drapery, these long perpendicular folds, correspond in character with the principles of Gothic architecture, and with it rose and declined. For the stiff, wooden limbs, and motionless figures, of the Byzantine school, he substituted life, movement, and the *look*, at least, of flexibility. His notions of grouping and arrangement he seems to have taken from the ancient basso-relievos: there is a statuesque grace and simplicity in his compositions which reminds us of them. His style of colouring and execution was, like all the rest, an innovation on received methods: his colours were lighter and more roseate than had ever been known; the fluid by which they were tempered more thin and easily managed; and his frescoes must have been skilfully executed to have stood so well as they have done. Their duration is, indeed, nothing compared to the Egyptian remains; but the latter have been for ages covered up from light and air in a dry sandy climate: those of Giotto have been exposed to all the vicissitudes of weather and of underground damp, have been whitewashed and every way ill-treated, yet the fragments which remain have still a surprising freshness, and his distemper pictures are still wonderful. It is to be regretted that the reader cannot be referred to any collection in England for an example of the characteristics here enumerated. We have not in the National Gallery a single example of Giotto or his scholars: the earliest picture we have is dated nearly two hundred years after his death: the only one in the Louvre (a St. Francis, as large as life) is dubious and unworthy of him. In the Florentine gallery are three pictures: Christ on the Mount of Olives, one of his best works; and two Madonnas, with graceful angels, &c. In the gallery of the Academy of Arts, in the same city, are more than twenty small pictures (the best works of Giotto are on a small scale —these measure about a foot in height): two of the same series are at Berlin, all representing subjects from the life and acts of Christ, of the Virgin, or St. Francis. Those who are curious may consult the engravings after Giotto in the plates to the 'Storia della Pittura' of Rosini; in those of D'Agincourt's 'Histoire de l'Art par les Monumens;' and in Ottley's 'Early Italian School,' a copy of which is in the British Museum.

[To be continued.]

FLOATING AND FLYING BRIDGES.

[Concluded from page 112.]

A more perfect arrangement than the bateaux is that of *pontoons*, adapted more or less by European armies generally. A pontoon is a kind of low flat vessel, somewhat resembling a lighter or barge, formed of a wooden frame-work, and either lined inside and out with tin plates, or on the outside only with copper plates. There are two sizes employed, the one measuring about twenty-one feet long by five wide, and the other seventeen feet long by four wide. These pontoons are to act as substitutes for boats in building a bridge of boats, or a "pontoon-bridge," and are carried with an army as part of its stores, when likely to be necessary. Each pontoon is carried on a distinct wheel-carriage formed for its reception; and with each one are stowed away all the materials for one portion of the bridge, so that a pontoon train consists not only of the pontoons, but of all the materials required for the bridge. A large pontoon, with its carriage appurtenances, weighs nearly two tons, and is drawn by six horses. A pontoon-train consists of a number supposed to be sufficient for the widest river the army will have to cross: it consists of thirty-six pontoons, which, with all the stores requisite for the operations, occupy fifty-six carriages, drawn by three hundred and sixteen horses. Each pontoon carries (or rather has belonging to it) beams, flooring-boards, gang-boards, oars, bolts, an anchor, a grapnel, a cable, a smaller rope, a boat-hook, and a few other stores; and the use of these may be simply explained as follows:—In building a pontoon-bridge, the pontoons are ranged across the river in a parallel series, and fastened either by a rope passing from shore to shore, or else by anchors, one to each pontoon. The intervals between the pontoons are rather greater than the width of the pontoons themselves. Strong beams, called 'baulks,' are laid from one pontoon to another, and securely fastened. On these are laid portions of flooring called 'chesses,' each chess consisting of boards joined together by wooden bars; and when these chesses are laid from end to end of the line, they form the flooring of a bridge over which infantry, cavalry, and artillery may pass. The army having passed, the bridge is taken to pieces, and all the pontoons, with their respective portions of the stores, &c., are hoisted upon their carriages, again to be dismounted when a second occasion may require.

We may next allude to those temporary bridges in which, instead of a flooring being established from bank to bank of a river, there is only a *portion* of a bridge, which receives its cargo on one shore, and then travels over to the other.

The contrivance known in military engineering by the name of a 'flying-bridge' is formed by enclosing a floating body in a river so as to receive the action of the stream obliquely; by which a force is derived from the current, to move the vessel across the river. The kind of movement obtained is very singular, and depends on the following principle:—if a boat, or any other floating body whose length greatly exceeds its breadth, be kept obliquely across a stream by a helm or any similar contrivance, and exposed to the natural action of the stream, the current will, by acting on the broadside more powerfully than on either end, drive it diagonally, so that while it descends the stream it is also driven towards one bank. Now the object of a flying-bridge is, to obtain the transverse movement, that is, the motion across the stream, and yet prevent the boat from descending the stream. To effect this, an anchor is firmly imbedded in the river, at some distance above the line of intended passage; and to this anchor a cable is attached, whose other end is fastened

to the boat or vessel; the intermediate portion of the cable being held up out of the water by being supported by smaller boats. The cable thus becomes the radius of a circular arc, which measures the greatest distance that can intervene between the anchor and the boat. Supposing the boat to be left now to itself, the course of the current would bring it to the middle of the stream, with its length in the direction of the stream. But if the boat be kept with its length making an angle with the stream (the best angle has been proved to be 54° 44′), the current will drive it over from one bank to the other, in a circular arc, of which the length of the cable is the radius. The current, unable to drive the boat down the stream by reason of the cable, is yet able to urge it across the stream, by virtue of its pressure against the oblique side of the boat. The boat effects one half of the passage in a descending arc (with the current), and the other arc in an ascending arc; and as the latter is obviously the most unfavourable, the ascent is rendered less considerable by having a longer cable, and consequently a flatter curve of transit. Sometimes two anchors are used at different parts of the river's width; and the boat is so managed that one half of the transit is made with the agency of one anchor, and the other half with that of the other; and in such a case the boat describes two curves in its passage instead of one.

We have spoken of a *boat*, for convenience of description; but the floating body thus driven across the river is generally a platform, supported by boats underneath, and capable of carrying a large body of men. A flying-bridge for the passage of a considerable river, such as the Rhine or the Danube, consists of a scaffolding or frame-work placed on two long, narrow, and deep boats or barges. The boats are placed side by side, with as great a distance between them as the strength of the structure will allow. Beams of stout timber are bolted down to the edges of the boats, and on the beams a stout flooring is laid. A draw-bridge or lifting-bridge is attached to each side of the platform, as a means of affording convenient ingress and egress to the passengers. Each boat is provided with a strong mast, twenty or thirty feet high, to which is to be attached the cable. Each boat is provided with a rudder, and both rudders are so connected that one person can manage them.

Two Thames barges fitted up in this manner would carry a platform or flooring fifty feet square, on which six hundred and fifty men might stand, and thus be conveyed across a river. Sometimes a stage of two stories has been erected in two boats, by which from fourteen to fifteen hundred men have been carried at once. A flying-bridge of this kind was constructed at Hunnengen, during one of the wars of the last century, in which a hundred and forty cavalry, with their horses and equipments, found room on the stage or platform: while five hundred infantry occupied the boats underneath. The length of the cable was three hundred toises, supported by ten boats, and fixed to a range of piles instead of anchors.

Another variety of flying-bridge is that in which, while the obliquity of the boat's direction is the primary cause of the movement across the stream, the boat is prevented from descending the river by a rope stretched across from shore to shore, instead of by a cable fixed to an anchor in the stream. It is generally when a river is too wide for the adoption of the former plan that recourse is had to the latter. A rope, called in sea-language a 'warp,' is stretched across the river, and is upheld in its medium parts by one or more buoys. The rope guides the boat while 'sheering'—a sea-term for the motion of a boat across a stream by the oblique action of the current.

Sir H. Douglas describes a flying-bridge of this kind as having been established across the Thames at Gravesend. The period was during the threat of invasion, when it was of great importance to have a well-established military communication between Gravesend and Tilbury Fort, without interrupting the navigation of the river. There were two warps, one for passing from Tilbury Fort to Gravesend, and the other for the return course. Each warp (consisting of five-inch cable) was four hundred and eighty fathoms in length, with fifty additional fathoms of spare warp ready for use. Each warp was kept nearly stationary at two points in the width of the river, by means of fourteen-inch cables, each cable attached to two anchors; so that each warp was retained by four anchors weighing about a ton each. The vessels employed were large barges, capable of containing a great number of troops; and each barge was attached to a warp in such a manner as to be able to move; while the direction of the barge with respect to the stream was regulated by a rudder. At the time when these plans were adopted, steam-boats were unknown; but it is probable that in the present day, and in such a spot, a steam-ferry would be adopted in preference to the 'warping.'

The harbours at Plymouth and Portsmouth display at the present day very remarkable examples of the flying-bridge moved by steam—or of steam floating-bridges, to use a better term. Contrivances of this kind are now working across Portsmouth harbour, from Portsmouth to Gosport, and across the Hamoaze, or Plymouth harbour, from Devonport to Torpoint. The principle is the same in both, and we will therefore speak only of that belonging to Plymouth, which preceded the other in point of time.

The Hamoaze at Torpoint is nearly half a mile wide at high-water, with a maximum depth of about a hundred feet. About fifty years ago, when the traffic from the Devonshire coast to the Cornish coast across the Hamoaze began to be considerable, the Earl of Mount Edgcumbe and Mr. Carew obtained an act of parliament authorizing them to establish a ferry at this spot. This ferry proved convenient to the inhabitants and profitable to the owners, till the year 1825: when, to meet the increasing demands of the public, a company took a lease of the ferry for twenty one years, and endeavoured to establish a 'twin steam-boat,' such as had shortly before been established at Dundee. The strength of the current was found to be too great to allow the boat to travel directly across the river with sufficient certainty for the purposes of traffic, and the experiment subsequently failed.

Mr. Rendel, a civil engineer, was then applied to for an investigation into the practicability of constructing a floating-bridge, which, while moved by the power of steam, should at the same time be protected from the strength of the current. From this investigation resulted the very ingenious and efficient floating-bridge now plying in the Hamoaze, and which Mr. Rendel himself has minutely described in a paper addressed to the Institute of Civil Engineers. We will briefly describe the bridge itself, and then the mode of propulsion.

The bridge is a kind of large flat-bottomed vessel, nearly as wide as it is long, being fifty-five feet long by forty-five wide. It is divided lengthwise into three portions, the centre of which contains the machinery by which it is worked, while the sides form two platforms on which the passengers and carriages are placed. At each end of each of these side platforms is attached a strong and commodious drawbridge, hung on hinges, which can be let down so that its extreme end may rest on the beach or shore, and thus form a convenient passage for passengers, horses, and carriages to or from the beach and the vessel. The side platforms are eleven feet in width, and the middle divi-

sion of the bridge contains one or two moderate-sized cabins.

The next point is, to explain how this singular-shaped structure is propelled. This is done by the aid of two strong chains, stretched side by side across the river, from one bank to the other. The length and weight of the chains are such that each chain, when the bridge is at one shore, lies along the bottom of the stream; and when the bridge is in the middle of its course the chain makes two curves, one between it and either shore. The chains are not permanently fixed at the ends, but are balanced by very heavy weights, so as to enable them to yield in a slight degree to any strain to which they might be exposed. The bridge or vessel is so connected with these two chains that it cannot drift beyond the limits to which they extend; it cannot go farther northward than the northern chain shifts, nor farther southward than the southern chain; and as the chains are limited in their lateral deviation by the weights at their two ends, the bridge is rendered nearly independent of the current.

But the chains do more than guide the bridge on its passage; the links, by a very curious arrangement, are made to supply the place of paddles. In the middle of the vessel is a steam engine, whose power is exerted in causing the rotation of two vertical wheels seven or eight feet in diameter. These wheels are parallel, about eleven feet apart, and lie in the direction of the length of the bridge. Round the periphery of each wheel is a series of cogs or knobs, exactly as far apart as the links of the great chains. The chains pass upwards from the water into one end of the bridge, over the cogs of the wheels, and down into the water again at the other end of the bridge; the cogs striking or catching into the links of the chain. Now when the wheels are made to rotate by the engine, as the cogs on the periphery cannot escape from the chain, one of two effects must result: either the chain must move on while the bridge stands still, or the bridge must move while the chain is stationary. The chain cannot move in the direction of its length, for it is fastened at each end, and therefore the bridge becomes propelled. The wheels rotate, and the cogs catch successively in all the links of the chain, thus causing the whole machine to be forcibly drawn onwards. By reversing the direction in which the wheels rotate, the vessel's direction of motion is changed also.

According to the power of the engine, so will the rapidity of the motion be regulated. Mr. Rendel states the velocity obtained in practice to be three hundred and twenty feet per minute, which gives about seven minutes and a half for the time of crossing the Hamoaze. Mail and stage coaches pass on to the bridge, just as if it were a common road, without disturbance to the passengers, and are then conveyed across. Mr. Rendel says that he has seen at one time on the bridge three four-horse carriages, one with two horses, seven saddle-horses, and sixty foot-passengers.

The chains of the bridge are sufficiently loose to dip deeply in the water, as a means of allowing the ships of war, many of which are kept on either side of the line of passage, to pass safely over them. The maintenance of this clear passage for the royal shipping was one of the difficulties with which the engineer had to contend; but it appears to have been successfully accomplished. There have been two of these bridges built, one for use while the other is under repair; and the two, with the whole of the arrangements pertaining to them, cost about 9000*l*. The bridge crosses the channel four times every hour, on an average of fifteen hours a day.

Mr. Rendel gives an anecdote which illustrates most remarkably the strength which it has been found practicable to give to this structure. "The shipwright who built the bridge, being desirous of exhibiting so great a novelty, invited a party of friends to witness the launch, which went off with great spirit and more *wine* than was sufficient for the christening. The wine in this, as in many other cases, caused its votaries to be altogether oblivious of such unimportant matters as time and tide, which, as they 'wait for no man,' so in this instance they ebbed faster than was perceived. It was the business of the builder to place the bridge in the basin of the new Victualling Yard, but a short distance from where the bridge was launched. With proper caution, the width of the entrance had been measured, and found sufficient for the bridge, but the measurement was taken at high-water. The batter (slope) of the pier heads of course narrowed the width of the entrance as the tide ebbed, so that when the bridge was brought to the basin the entrance was found just too narrow, and being caught on a rapidly falling tide, the bridge was *literally suspended between heaven and earth* for eight or ten hours till the return tide!" Not a bolt, or timber, or plank started under this severe ordeal.

Co-operative Labour amongst Small Proprietors in Switzerland.—The properties are too small, in general, to keep more than five or six cows all winter, and few can keep more than half that number. Yet these small proprietors continue to send cheese to market as large as our Cheshire dairy farmers, with their dairy stocks of forty or fifty cows, and farms rented at 200*l*. to 300*l*. a year. Gruyère and Parmesan cheeses are quite as large as Cheshire cheeses, and, at the price here, are incomparably better in quality. They are made by small farmers, each of whom has not, on an average, the milk of half a dozen cows to make cheese of. Each parish in Switzerland hires a man, generally from the district of Gruyère, to take care of the herd and make the cheese; and if the man comes from Gruyère, all that he makes is called Gruyère cheese, although made far enough from Gruyère. One cheeseman, one pressman or assistant, and one cowherd, are considered necessary for every forty cows. The owners of the cows get credit, each of them, in a book daily, for the quantity of milk given by each cow. The cheeseman and his assistants milk the cows, put the milk all together, and make cheese of it; and at the end of the season each owner receives the weight of cheese proportionable to the quantity of milk his cows have delivered. By this co-operative plan, instead of the small-sized, unmarketable cheeses only, which each could produce out of his three or four cows' milk, he has the same weight in large marketable cheese, superior in quality, because made by people who attend to no other business. The cheeseman and his assistants are paid so much per head of the cows, in money or in cheese; or sometimes they hire the cows, and pay the owners in money or cheese.—*Mr. Laing's Notes of a Traveller.*

The Partial and the Comprehensive.—A Hindustanee Parable.—In a certain country there existed a village of blind men, who had heard of an amazing animal called the elephant, of the shape of which, however, they could procure no idea. One day an elephant passed through the place: the villagers crowded to the spot where the animal was standing, and one of them seized his trunk, another his ear, another his tail, another one of his legs. After thus endeavouring to gratify their curiosity, they returned into the village, and, sitting down together, began to communicate their ideas on the shape of the elephant to the villagers: the man who had seized his trunk said he thought this animal must be like the body of the plantain-tree; he who had touched his ear was of opinion that was like the winnowing fan; the man who had laid hold of his tail said he thought he must resemble a snake; and he who had caught his leg declared he must be like a pillar. An old blind man of some judgment was present, who, though greatly perplexed in attempting to reconcile these jarring notions, at length said—"You have all been to examine the animal, and what you report, therefore, cannot be false: I suppose, then, that the part resembling the plantain-tree must be his trunk; what you thought similar to a fan must be his ear; the part like a snake must be the tail; and that like a pillar must be his leg." In this way the old man, uniting all their conjectures, made out something of the form of the elephant.—*Rev. W. Ward's Literature, History, &c. of the Hindoos.*



[The Exterior of the Temple Church from the South.]

THE TEMPLE CHURCH.

If one had never heard of the existence of such a Society as the Templars—a band of men who sought to be as conspicuous for their piety as for their military skill and courage, and who made it the business of their lives to reconcile the two pursuits—it would be still difficult to look on the exterior of the structure which has been recently restored, without some such idea occurring to the mind. In the massive Round with its buttresses and narrow windows we are inevitably reminded of the strong circular keep or stronghold of the castles of the middle ages, whilst the junction of the oblong portion, built in the purest and most beautiful of the early English Ecclesiastical styles, at the same time tells plainly enough that no mere warriors erected the whole. And the interest likely to be aroused by such associations is only the more deepened when we inquire into the history of the Order, when we read of Hugh de Payens with only eight companions devoting themselves, as "poor fellow-soldiers of Jesus Christ," to the defence of the pilgrims on the high road to Jerusalem, recently forced from the Saracens by the early Crusaders, and learn that from this humble origin sprung the mighty fellowship, which extended its ramifications through every country of Christian Europe, which comprised a large portion of the noblest in blood, and most influential in wealth and power, of European chivalry; when we read also of the poverty—Hugh de Payens and another knight riding on one horse for instance—the humility and self-sacrifices to which they at first voluntarily submitted themselves, of their heroism in active warfare as well as in passive endurance, of their decline and fall as they grew prosperous and corrupt, and then of the sudden restoration of the old spirit in the purifying flames of the horrible death to which many of the most illustrious members were subjected at the period of the extinction of the Order, by the rapacious monarchs of Europe thirsting for their enormous wealth; when we read of these things, we might naturally suppose that it would be difficult to find any other circumstance that could materially enhance in our eyes the chief of the structures built by these men in our country. And had the Temple Church, as we have always hitherto seen it, been in the state the Templars had left it, no doubt the feeling would have been a correct one; but we now know that with the exception of the bare outline of the walls, pillars, and windows, no building could be less like the church of the Knights Templars than the Temple Church; and the great charm and value of the recent works in this now most beautiful of English buildings, is that they are all strictly works of restoration. In looking at the decorations, so novel to our eyes, and in such a place so opposed to our ordinary ideas of fitness, as well as at the great expenditure incurred, this fact must be constantly borne in mind. That it is a fact we shall have various opportunities of noticing in the progress of our paper.

To the lovers of Gothic architecture, a designation that promises shortly to be synonymous in effect with persons of taste and intelligence generally (already the notion of the irregular genius of the style has shared the fate of the somewhat similar notion concerning our great dramatic poet)—to such persons the Temple offers an additional feature of interest and instruction, being looked upon by architects as the most interesting example we possess of the transition from the plain massive Norman to the light and elegant early English. Thus we have before us the Round with its semicircular bended windows, Norman, but Norman in the last stage of the change to something else—already grown slender and elongated; and we have the oblong with its pointed windows of the very perfection of what is called the lancet style. But to return to matters of more general interest: the period of the erection of the edifice is from some little time prior to 1185, when the Round was dedicated, in honour of the Virgin Mary, by Heraclius, patriarch of Jerusalem, up to 1240, when the oblong was consecrated on Ascension-day. The Templars had before this a house on the site of the present Southampton Buildings, Holborn. Here

clius was in England on business of a very critical nature at the time of the dedication. In a battle on the banks of the Jordan, in 1179, the great body of Knights Templars had been nearly cut to pieces by Saladin, and the grand-master taken prisoner, to perish in prison by his own firmness or obstinacy, in resisting all overtures for exchange or ransom. The Christian armies, however, so far redeemed themselves from the temporary disgrace of this defeat, as to be able to obtain a truce for four years, whilst they sent Heraclius and the masters of the Temple, and the kindred society of the Hospitallers, through Europe to seek fresh aid. They in particular hoped much from Henry II. of England; so much, indeed, that when the king and his chief nobility offered to raise fifty thousand marks for the purpose of paying the expenses of a levy of troops, and to agree that all persons who pleased might engage in the cause, the patriarch seems to have been at once deeply disappointed and indignant. "We seek a man and not money," was his reply; "well near every Christian region sendeth unto us money, but no land sendeth to us a Prince:" and departing in this state of dissatisfaction, Henry, who had reason to dread the power of the Church, remembering the affair of Beckett, followed him to the seaside, in order to appease his anger. "But," continues Fabyan, "the more the king thought to satisfy him with his fair speech, the more the patriarch was discontented, insomuch that, at the last, he said unto him, 'Hitherto thou hast reigned gloriously, but hereafter thou shalt be forsaken of Him whom thou at this time forsakest. Think on Him, what he hath given to thee, and what thou hast yielded to Him again; how first thou wert false unto the king of France, and after slew that holy man Thomas of Canterbury, and, lastly, thou forsakest the protection of Christian faith.' The king was moved with these words, and said unto the patriarch, 'Though all the men of my land were one body, and spake with one mouth, they durst not speak to me such words.' 'No wonder,' said the patriarch, 'for they love thine, and not thee: that is to mean, they love thy goods temporal, and fear thee for loss of promotion, but they love not thy soul.' And when he had so said he offered his hand to the king, saying, 'Do by me right as thou didst by that blessed man Thomas of Canterbury, for I had liever to be slain of thee than of the Saracens, for thou art worse than any Saracen.'" But Henry, however inly exasperated, was determined not to edify his subjects by another kingly scourging, so answered patiently, "I may not wend out of my land, for my own sons will arise against me when I am absent." Somewhat irreverently the patriarch closed the conference by remarking, "No wonder, for of the devil they come, and to the devil they shall go;" and so hurried away. Such were the circumstances connected with the dedication of the Temple in 1185.

In our walk round the exterior we are reminded of an interesting chapel formerly attached to its south side; the chapel of St. Anne, where the solemn ceremony of introducing new members into the Order took place. The rules of the Templars, which were very strict, were from the hand of St. Bernard, who at an early period of their career treated them with marked consideration. The new member having satisfactorily answered in private to the questions put to him, affirming that he was free from all obligations, such as betrothal, marriage vows, or consecration in connection with any other order, debt, disease, or weakly constitution, was ushered into the chapel, where he found present the entire body of knights. With folded hands and bended knees, he then said to the master: "Sir, I am come, before God and before you and the brethren, and pray and beseech you, for the sake of God and our dear Lady, to admit me into your Society, and the good deeds of the Order, as one who will be all his life lon[illegible] servant and slave of the Order." In answe[illegible] was warned, that he was desirous of a great matter; that he saw nothing but the shell, the fine horses and rich caparisons, the luxurious fare, and splendid clothing; but that he knew not the rigour which lay within. He was told it was a hard matter for him, his own master, to become another's servant; to watch when he wished to sleep, and find his most ordinary actions similarly controlled. The candidate, however, answering firmly to all the questions that followed, and binding himself to be obedient to the master of the house, as well as to the master of the order generally, to observe the usual customs, to live chastely, and help with all the powers God had given him to conquer the Holy Land, and to befriend all oppressed Christians, was received into the coveted brotherhood, and whilst he was assured of bread and water, clothing, and "labour and toil enow," the Templar's habit was put on his limbs, and he too was a Knight Templar. The building in which these interesting scenes occurred appears to have consisted of two stories, each with a separate entrance from the church, each with a groined and vaulted roof, and each divided near the centre by a massive and no doubt very elegant archway. A portion of the building fell in 1825, and during the repairs, commenced about that time, of the Round, the whole was swept away. Such, we are glad to say, is not the spirit in which the late extensive reparations have been carried on. With a few words on this subject, by way of preliminary to the splendid scene that awaits us in the interior, we conclude the present paper. From the time of the Puritans down to the very act we have last alluded to, the removal of the chapel of St. Anne, the Temple church seems to have been undergoing one steady process of degradation or mutilation in all that respects its original beauty or completeness; and it would be difficult to say which have done the most injury, the early church reformers who damaged it on principle, or the kind benefactors of the seventeenth and eighteenth centuries, who repaired and beautified it, making a very labour of love of the display of their bad taste. Thus in 1682 a screen of "light wainscot" was stretched across the space between the two parts of the structure, cutting them asunder, and destroying at once all sense of harmony, or size, or fine perspective. This screen, by way of refresher to eyes wearied with the eternal Gothic stamped on the building around, was decorated with Corinthian pilasters and other suitable appendages. And that there might be no stealing a glimpse over the screen through the great central archway, a new organ was placed in that spot, with its classic front reaching nearly to the groined ceiling of the nave. There only remained to close up or to hide the form of the beautiful lesser arches on each side, which was carefully done, and to put in glass doors and windows in the lower portions of all the arches; and that too accomplished, no doubt the worthy benchers smirked, and smiled, and congratulated themselves, as they stepped backwards and forwards, painter-fashion, some such exclamation no doubt escaping at intervals, as "Come, I think that's very nice and snug." But there was yet much to be done to bring everything into perfect order. The marble pillars looked bluish and cold, and the roof looked hollow and high, and the tessellated pavement felt uncomfortable, and the walls were sadly naked. So to work once more went the beautifiers: the pavement was raised up by a good layer of earth, some more "light wainscot" was obtained, and placed all round the walls, the pillars were cased a good way up in the same material, and the rest did not much matter, as they were there stuck over pretty thickly with

tablets, or concealed by large gilded monuments: the church was also well paved; and, as a finish, the whole, pillars, capitals, cornices, roof, groins, and wall, were plastered and whitewashed. Add to these features of the Temple Church as it was, the cumbrous pulpit with carved cherubims, and vases, and a still more cumbrous sounding-board—add also the altar-pieces, an immense work in the same Corinthian style, actually concealing no inconsiderable portion of the great eastern window, as the monuments along the sides entrenched upon the windows of the aisles—and we must acknowledge that the said beautifiers did not work by halves—that, in short, they made everything so very complete in one way, that it is only surprising their successors should have ventured to undo the whole, in order to try their hands at another. And though they did venture, and with a result that forms probably the commencement of a new era in the restoration of our old buildings, as well as in the decoration of all, there were not wanting persons to warn them of the reckless course they proposed to pursue. "As a proof," says Mr. Burge,* "how little the public were acquainted with the character of the Temple Church, and with those parts of its style and construction which constituted its beauty, it may be mentioned, that when the restoration was commenced in 1840 the removal of these beautifications and adornments for the purpose of effecting the restoration was regarded and publicly reprobated as an act of vandalism, evincing an utter disregard for the ancient and original beauty of the church, and a fond devotion to the frivolous and degraded styles of modern architecture." It were not without interest to follow the successive steps of the restoration to see how the recovery of one beauty led to that of another; the removal of the screen to the removal of the organ; that of the great pews to that of the pulpit; or to see how the removal of the whitewash above and the rubbish below, and consequent discovery of the remains of the original decoration, led to the revival of such decorations in the sumptuous roof, and windows, and pavement, that now meet the eye; but our space will only allow us to notice the result of the whole as exemplified in the magnificent interior, towards which we now advance.

[To be continued.]

* 'The Temple Church.'

ON PRETERNATURAL RAINS.

Though the world talks of the skies "raining cats and dogs," yet this is evidently regarded merely as a pleasantry, not likely to be disturbed by the fulfilment of the phenomenon. But if we were told that the skies had "rained fishes," and were to regard that as equally a joke, it might be found that incredulity proceeded in this case a little too far. The recorded instances bearing on this point are too numerous, and too well authenticated, to be disbelieved or slighted.

The phrase "raining fishes" is merely indicative of the popular notion entertained respecting the phenomenon in India, where it occurs very frequently; the facts themselves may be recorded without the necessity for assent to so startling an idea as the precipitation of fishes from the clouds. All that is meant to be conveyed by the expression is, that fishes are found to fall on dry land, under peculiar states of the weather.

Newspapers and periodicals published in India frequently contain notices of these falls of fish; and one gentleman, writing on the subject, says:—"I was as incredulous as my neighbours, until I once found a small fish, which had apparently been alive when it fell in the brass funnel of my pluviometer at Benares, which stood on an insulated stone pillar, raised five feet above the ground in my garden." Another gentleman, writing in September, 1839, and in relation to a spot about twenty miles south of Calcutta, states:—"About 2 o'clock P.M. of the 20th inst. we had a very smart shower of rain, and with it descended a quantity of *live fish*, about three inches in length, and all of one kind only. They fell in a straight line on the road from my house to the tank, which is about forty or fifty yards distant. Those which fell on the hard ground were as a matter of course killed from the fall; but those which fell where there was grass sustained no injury; and I picked up a large quantity of them 'alive and kicking,' and let them go into my tank.... The most strange thing that ever struck me, in connection with this event, was, that the fish did not fall helter-skelter, everywhere, or 'here and there;' but they fell in a straight line, not more than a cubit in breadth." The explanation which this gentleman deems most probable, is one to which we shall allude farther on.

Another example is stated to have taken place near Allahabad.* About noon, on a particular day in the month of May, the wind being from the west, and a few distant clouds visible, a blast of high wind came on, accompanied with so much dust as to change the tint of the atmosphere to a reddish hue. The blast appeared to extend in breadth four hundred yards, and was so violent that many large trees were blown down. When the storm had passed over, the ground, south of the village where the observation was made, was found to be covered with fish, not less than three or four thousand in number. The fish were all about a span in length, and of a species well known in India. When found they were all dead and dry.

A lady residing at Moradabad, in a letter to a friend in England, in 1829, gives an account of a number of fish that had fallen in a shower at that place: many of these were observed springing about upon the grass in front of the house, immediately after the storm. The letter (which was read before the Linnæan Society) was accompanied by a drawing of one of the fish, taken from life at the moment: it was a small species of *cyprinus*, two inches and a quarter long, green above, silvery white below, with broad, lateral, bright red lines.

In our own land there are not wanting instances bearing on this point; and it is probable that these accounts have been extensively disbelieved as much on account of their rarity as of their apparent marvellousness. The following narration, while it indicates what was in all probability a fact, includes an hypothesis which does not necessarily belong to it, and which may have interfered with the reception of the narration itself: it is from Hasted's 'History of Kent.' "About Easter, 1666, in the parish of Stanstead, which is a considerable distance from the sea or any branch of it, and a place where there are no fish-ponds, and rather a scarcity of water, a pasture-field was scattered all over with small fish, in quantity about a bushel, supposed to have been rained down from a cloud, there having been at the time a great tempest of thunder, rain, and wind. The fish were about the size of a man's little finger. Some were like small whitings, others like sprats: and some smaller, like smelts. Several of these fish were sold publicly at Maidstone and Dartford." The hypothesis here is evidently that the fish had been "rained down from a cloud;" one which certainly taxes the powers of belief.

In the year 1830 the following appeared in a local Scotch newspaper:—"On the 9th of March, 1830, the inhabitants of the island of Ula, in Argyleshire, after a

day of very hard rain, were surprised to find numbers of small herrings strewed over the fields, perfectly fresh, and some of them exhibiting signs of life."

Now all these accounts become explicable if we presuppose the occurrence of a violent storm of wind; and it is observable that nearly all the accounts agree in stating that high and strong wind accompanied or preceded the phenomenon noticed. A very violent wind, driving obliquely over the surface of a river, may be able to carry along with it the smaller and lighter fish swimming near the surface (and they are all *small* which are said to fall "with rain"), leaving the heavier ones behind, and depositing the lighter ones on dry land, as soon as the force of the blast becomes proportionably less than the weight of the fish. A writer on this subject in Rees's 'Cyclopædia' says:—"The raining of fishes has been a prodigy much talked of in France, where the streets of a town at some distance from Paris, after a terrible hurricane in the night, which tore up trees, blew down houses, &c., were found in a manner covered with fishes of various sizes. Nobody here made any doubt of these having fallen from the clouds; nor did the absurdity of fish of five or six inches long being generated in the air at all startle the people, or shake their belief in the miracle, till they found upon inquiry, that a very well-stocked fish-pond, which stood on an eminence in the neighbourhood, had been blown dry by the hurricane, and only the great fish left at the bottom of it, all the smaller fry having been tossed into the streets."

It is probable that this last example would be found illustrative of a large proportion of the cases recorded; since it is not necessary to the truth of the accounts that the fish should have fallen near a pond or stream. A high wind may at the same time be so fierce and so long continued as to carry the fish or any other bodies wafted with it to a great distance. A curious instance has been recorded by Mr. Fairholme, who wrote on this subject in the 'Asiatic Journal;' which, though not relating immediately to fish, will show how articles may be suspended for a time in the air by the action of the wind:—"I remember on one occasion, in the midst of the most perfect tranquillity, and in a very sheltered garden in the south of Scotland, seeing a quantity of clothes, which had been spread to dry on a smooth bowling-green, suddenly thrown into the utmost confusion, and some of the articles carried up into the air so high as to be nearly lost to view. They were watched by myself and others for upwards of half an hour, and were found next day at a distance of three miles."

This example will serve to illustrate not so much the effect of a direct and rushing wind, as another wind to which these results have also been referred, viz. a whirlwind. These extraordinary phenomena, occasioned probably by sudden irregularities in the temperature and electrical condition of the air, manifest themselves in a violent spiral aërial current, whirling upwards with great rapidity, and carrying up within their vortex any small or light bodies which may be within their circuit. If this should occur at sea, an immense volume of water is carried up at the same time, forming what is called a water-spout; and it is unquestionable that if water can be thus drawn up, small fishes may be similarly affected. If the spiral current of air, whether including water within it or not, remain stationary above the spot where it was formed, then whatever was drawn up with it will after a time be precipitated nearly to the same point as that from whence it was taken; but if the whirlwind or water-spout itself moves onward, then the contained matters will be carried with it, until the force of the blast dies away, and the substances are precipitated to the ground simply by their own gravity. Whirlwinds of this kind are very common in India; and it seems consistent with all the details hitherto recorded, that when fishes, either alive or dead, are seen to fall to the ground, they have been wafted from some sea, lake, river, or pond, by one of these two agencies—either a powerful wind, which by sheer force drove the fish out of their watery element; or by a whirlwind, which drew the water and the fish upward in its vortex by a species of suction, and then wafted them to a considerable distance before precipitation.

The lovers of the marvellous are wont to talk of the raining of frogs, the raining of stones, the raining of blood, and many other astounding matters of a similar kind; but, as may be well supposed, the details admit of interpretation very different from the popular one. Swammerdam relates the following circumstance as having occurred at the Hague in 1670:—"One morning the whole town was in an uproar on finding their lakes and ditches full of a red liquid, which was with the common consent of the vulgar believed to be blood The lakes were known to be full of water the night before; and it was therefore deemed a logical inference that there must have been a shower of blood during the night. A physician, however, went down to one of the ditches, and took home from thence a quantity of this blood-coloured liquid: he examined it by the microscope, and found that the water was water still, and had not at all changed its colour; but that it swarmed with a prodigious number of small red animals, all alive, and very nimble in their motions, whose colour and number gave a red tinge to the whole body of the water they lived in, when viewed from a distance. The certainty, however, that this was the case did not persuade the Hollanders to renounce the marvel: they came to the conclusion that the sudden appearance of such a number of animals was as great a prodigy as the raining of blood would have been and for generations afterwards it was regarded as a portent and foretelling of the scene of war and devastation brought about in Holland by Louis XIV."

The appearance of the insects in such numbers is accounted for thus (for as no one appears to have asserted that he saw blood-coloured liquid fall from the clouds, we are spared the necessity of any further explanation): these little animals are the pulices arborescentes of Swammerdam, or the water-fleas with branched horns. These creatures are of a reddish-yellow or flame colour. They live about the sides of ditches, under weeds, and among the mud, and are therefore not generally very visible. At about the end of May and the beginning of June, however, these little animals leave their recesses, to float loose about the water, and by that means become visible by the colour they impart to the water. It has been remarked that it is always at this season that the ignorant have been alarmed by the notion of blood-rain.

High winds, little red insects, and meteorolites will probably exhaust the list, and explain the causes, of what are termed "preternatural rains."

Vineyard Cultivation.—The vineyard is but a garden. The hand-labour is incessant in all the different operations, and yet it is not, like the hand-labour in a garden, applied to but a few fruit-trees, or plants, or beds, with which you form a kind of acquaintance that ripens into friendship in the course of years. The vines are too many, and each too insignificant by itself, for that kind of pleasure; and the land under vines being always under vines, you do not get intimate either with the acres or beds, as in corn and grass husbandry, nor with the individual plants, as in gardening. Then the eye has nothing agreeable to dwell upon in the dotty effect of a field of vines, and the ear misses the rural music of a farm—the crowing of the cock—the lowing of the cattle—the sound of the flail. It is, in spite of poetry, a dull manufacture.—*Mr. Laing's Notes.*



[illegible]

THE TEMPLE CHURCH.

[illegible] 17.]

A VERY deeply recessed and sumptuously enriched Norman gateway leads from the low western porch at the extremity of the western extremity of the building into the Round, and at once places before us the view seen above. Among the variety of objects that press upon the attention it is difficult to fix upon any one. There are the painted windows at the farthest end, appearing like some sudden discovery of one of the rich art-works of the olden time that we have so often read of; and the painted roof, scarcely less splendid, and from its novelty still more interesting; nearer still there are the three beautiful arches which rather connect than divide the two portions of the structure, the very arches so mercilessly closed up and disfigured; whilst around us is the beautiful aisle, with its groined roof supported at intervals by stately dark marble pillars that rise conspicuously from the arcade of pointed arches decorating the lower part of the wall; and lastly, in the centre, divided from the aisle by the circle of tall clustered marble columns that support its lofty roof, is the tower or central portion of the Round, with its series of archways opening into the gallery or triforium—its clerestory or range of windows, one of them—the gift of Mr. Willement—painted; and above the roof, where the compartments formed by the bold groinings are studded over with delicate blue ornaments on a kind of [illegible] ground, the centre standing out from all the rest by its richer and more varied display of colour, surrounding a magnificent gilt boss. The painted window mentioned, with its deep rubies, and purples and bronze, represents Christ enthroned, and the general design of the decoration of the dome is borrowed from an existing monument of the Italian church. Among the features of interest in this part of the structure are the heads which decorate the arcade in the aisle, sixty-four in number, and which were probably intended to represent, on one hand, the circle—that to the left—a state of purgatory, and on the other of relief from it by the mediation of the Church. But as none of the heads are original, and some of them not even copies of the original designs, it is not easy to prove the truth of this hypothesis. But we perceive, first, that in other parts of the structure, the entrance archways to the aisles of the oblong, the opposing character of the two corbel faces in each arch bear evident reference to an idea of the kind; and secondly, the half circle that was most carefully restored—the left or northern—presents but comparatively few exceptions to the painful character expressed by all the heads on that side, and which has been marked throughout by the nicest discrimination of the different kinds of manifestation of pain proper to so many different classes of individuals. The philosopher looks as though he would pluck out the heart of even this mystery; the satirist or misanthrope as though he had as much contempt for pur-

gatory as all other things, even while he felt its power; on the other hand, where the individuals represented are less intellectual, and more sensual, the appropriate expressions are no less strikingly developed: here, beauty is distorted into a thing it would tremble but to see; here one can hardly avoid feeling the claws and teeth of the animal tearing the ear: whilst there is one head, combining a mingled sensation of physical and mental horror which surpasses description—it is ghastly—fearful!—it is as if all the worst passions of man's nature had been gathered together in one point and then smitten with some intolerable agony. But perhaps the most interesting of the whole is the last of this circle, a female's face—probably a mother, who forgets even the anguish of her own sufferings in the passionate, yet quiet, because hopeless, misery of reflecting on those she has left behind. Mixed with the heads we have referred to are a great variety of grotesques, and the whole are highly deserving of attention. According to Mr. Addison, the author of the recent 'History of the Knights Templars,' an arcade and cornice similarly decorated with heads have been found in the ruins of the Temple churches at Nice, and in their famous fortress near Mount Carmel, known as the "Pilgrims' Castle." We must not omit to add that the original heads, after being carelessly, because inartistically copied, were used in the builder's yard to slip beneath cart wheels occasionally! And that is but about eighteen years ago.

The pavement of the Temple Church has attracted much attention, and deservedly. On removing the rubbish beneath the late pavement, patches of the former decorated one were found; and, accordingly, the Benchers, in pursuance of the rule that has constantly guided them, determined to restore the old encaustic tile. And as they had the old quarry at Purbeck re-opened purposely for the supply of the right material for the new pillars which it was found necessary to have in the Round, so did they seek and obtain permission to have the flooring of the Chapter-house at Westminster Abbey taken up, to learn the exact nature of the decorations used at the period in question, and then made arrangements to have the tiles manufactured accordingly in Staffordshire. The prevailing colour is yellow or amber, forming the decorative parts, upon a dark red ground. The decorations combine a great variety of heraldic and pictorial subjects, as animals with their tails linked together, cocks and foxes, figures playing upon musical instruments; but the chief ornaments are the symbols of the two Societies of the Temple, the Lamb and the Pegasus: the former founded on the device of St. John; and the latter, it is supposed, from the interesting circumstance before mentioned concerning the founder of the Order, and the poverty which for a time prevailed among the Templars. Mr. Willement, in his 'Report to the Societies on the subject of the Decorations of the Church,' which were confided entirely to him, says, "It very probably took its rise from the earliest device of the Knights Templars, namely, the two knights on the same horse. From an imperfect impression of an imperfect seal, these two knights were by mistake converted into two wings, which the classic taste of the reign of Elizabeth might induce the Society to think a very pretty device, and the error has been, without further examination, perpetuated." A good joke in poetical guise has made these emblems noticeable; the verses here following are said to have been first chalked up on the Temple gates:—

> As by the Templars' hold you go,
> The Horse and Lamb display'd,
> In emblematic figures shew
> The merits of their trade.
>
> That clients may infer from thence
> How just is their profession—
> The Lamb sets forth their innocence,
> The Horse their expedition," &c.

But, of all the objects of interest in the Round, the recumbent figures of the Crusaders, on the floor, most eminently deserve and justify examination. These but two years ago looked generally more like rude masses of worthless stone than anything else, the surface being extensively decayed—noses, fingers, swords, legs and feet every here and there missing—all delicacy of workmanship, such as expression in the faces, or minute points of costume in the garb, apparently lost. It was found, indeed, that they were too far gone for restoration. A trial, however, was permitted to be made on one of them—the exceedingly graceful figure that is nearest to the central walk of the second pair on the right hand—and the sculptor, Mr. Richardson, set to work. The paint and whitewash, in places a quarter of an inch thick, were first removed by means of a finely-pointed tool (washes of a sufficiently powerful kind it was feared would be injurious to so decayed a surface), and the surface made clean; a chemical liquid was then forced into the stone to harden it, and, next, the restoring process begun. This consisted of two parts—filling up all the hollows (which were so numerous as to make the effigy appear like a honeycomb) with a composition exactly imitating the stone, and becoming immediately almost as hard; and, secondly, of supplying the missing limbs and members by the authority of those which remained, worked in the same material, and joined by the composition. Except in very urgent cases, the original surface, however decayed, was left untouched, and no restorations were made without absolute evidence that they *were* restorations; and yet the result is the very beautiful and noble effigies which once more grace the floor of the Temple Church in their pristine state; one only exception being made as to the coloured decorations in painting and gilding, which it was discovered by Mr. Richardson, in cleaning them, they had formerly borne, particularly those which had not been wrought in Purbeck marble: the effigy of William Marshal the younger seems to have been most rich in this respect; traces were found on it of a crimson surcoat, gilded armour, and of glass enamelling about the cushion.

Whilst upon this subject we may observe that other interesting discoveries of a similar kind were made during the recent restoration. Some of the corbel heads before referred to in the intervening archways of the aisles had *glass beads* for eyes: and only a week before the re-opening of the church a beautiful little seraph-like head was discovered at the corner of one of these archways (between the Round and the southern aisle), which had been most delicately coloured: from the traces remaining, it could be discerned that the eyes had been blue, the lips tinged with vermilion, and the cheek with a flesh-colour, and that the graceful flowing hair had been gilded. How all this reminds one of the custom of the Greeks, even in the purest eras of art among them; and of the extraordinary length to which they carried this species of decoration in works which to our eyes seem so beautiful in their naked simplicity, that they could only be impaired by such additions. With them we find metal, precious stones, or imitations of precious stones, used for the eyes of their busts and statues, as well as glass; we find them also inlaying the lips. Different-coloured marbles were used in the same work, and compositions of metal formed to harmonize in hue with the feeling intended to be expressed by the sculptor. One of the most interesting examples of the latter is that mentioned by Plutarch, a statue of Jocasta, wife of Laius, king of

Thebes, by the sculptor Silanion, in which the queen was represented dying. By an ingenious mixture of the metals of which it was formed, and, it is said, chiefly by the addition of silver, a pallid tone was produced, which greatly increased the intensity of the expression in the features. By similar means, no doubt, was produced the bronze statue of Cupid by Praxiteles, so much admired by Callistratus for its elegance of position, the arrangement of the hair, its smile, the fire in the eyes, and the vivid blush in the countenance: and the iron statue of Athamas at Delphi, mentioned by Pliny, which represented the king, sitting, after the murder of his son: this work, it appears, was not entirely of iron, for the artist Aristonidas, wishing to express the effect of confusion and remorse in the countenance of the king, used a mixture of iron and bronze, which should imitate in some measure the blush of shame.* Seeing then that we have such high authorities for the coloured decorations of statues, and that these heads in the Temple Church *were* coloured, it may almost be doubted whether the restoring process should have stopped short of this point: that is, supposing there were sufficient materials to have restored it rightly. To return: the effigies, nine in number, lie four on each side of the central walk, in a double line, the ninth being farther off on the right against the wall, in the aisle, and corresponding in position with the simply but elegantly carved stone coffin-lid in the opposite aisle. As far as it has been found possible to identify the effigies, five out of the nine are assigned as follows:—Of the first pair on the right, the farthest figure is that of the great Protector Pembroke, whose statesman-like policy freed England from the foreigners whom the revolted barons had introduced in self-defence against John, and restored at the same time to the throne of the young Henry the allegiance of hearts that had been long alienated from it; the other and nearer figure by his side is one of Pembroke's sons, William Marshal, the Younger, who overthrew Llewellyn of Wales, and was one of John's hated opponents, a supporter of the Great Charter, although John's own son-in-law, having married his daughter. Henry III. followed his funeral to the grave here, and was so affected that he could not restrain his grief from being visible to all the bystanders. Of the second pair the foremost is unknown, the other is the effigy of Gilbert Marshal, another of the Protector's sons, who died at a tournament which he had instituted, through a fall from a runaway horse. The figure still farther to the right, De Roos's, an exquisitely beautiful piece of sculpture, refers also to one of the great men of the Charter. On the left, one only of the figures has been recognised, the foremost of the two nearest the western door, which is Geoffrey de Magnaville's, a grandson of the Norman follower of William, who so distinguished himself at the battle of Hastings, and whose history was of no ordinary kind. During the civil war in the reign of Stephen, Magnaville, having deserted the cause of the latter, held the Tower for Maud, and was attacked there by the citizens, without success; but being taken prisoner at St. Albans, in 1143, was compelled to give it up with his other possessions. From that time De Magnaville seems to have grown tired of rapine and plunder on another's account (for much of the civil war at that time seems to have been little else than rapine and plunder), and to have determined to act entirely upon his own, respecting no party—treating the Church no better than the laity. One of his exploits was robbing Romsey Abbey of its consecrated vessels, among other valuables. He was killed by an arrow, which pierced his brain, as he was besieging the royal castle at Burwell, the archer's aim having been probably invited by his removing his helmet on account of the heat of the day. Of course he had been excommunicated for such deeds as that before mentioned, and in consequence no one dared to bury him in consecrated ground. The Templars, however, with whom no doubt he was connected as a kind of lay-brother and benefactor, wrapped his dead body in their habit, placed it in a leaden coffin, and then suspended it from one of the trees in their garden here. Some years after, absolution was obtained, and the body buried in the porch before the entrance doorway, and there two bodies were recently found, one of them no doubt his. Of the unknown figures, one very probably is the effigy of William Plantagenet, fifth son of Henry III., who was buried in the Temple Church. Those of the nine figures which have the legs crossed are, we need hardly mention, persons who had joined in the Crusades, or were under vows to do so. The whole form the most valuable series of examples of military costume that we possess, from the days of Stephen to those of Henry III.

[To be continued.

* See 'Penny Cyclopædia,' article SCULPTURE.

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. VI.

GIOTTO AND HIS SCHOLARS.

[Continued from p. 122.]

GIOTTO'S personal character and disposition had no small part in the revolution he effected. In the union of endowments which seldom meet together in the same individual—extraordinary inventive and poetical genius, with sound, practical, energetic sense, and untiring activity and energy—Giotto resembled Rubens; and only this rare combination could have enabled him to fling off so completely all the fetters of the old style, and to have executed the amazing number of works which are with reason attributed to him. His character was as independent in other matters as in his own art. He seems to have had little reverence for received opinions about anything, and was singularly free from the superstitious enthusiasm of the times in which he lived, although he lent his powers to embodying that very superstition. Perhaps the very circumstance of his being employed in painting the interiors of churches and monasteries opened to his acute, discerning, and independent mind reflections which took away some of the respect for the mysteries they concealed. There is extant a poem of Giotto's, entitled 'A Song against Poverty,' which becomes still more *piquante* in itself, and expressive of the peculiar turn of Giotto's mind, when we remember that he had painted the Glorification of Poverty as the Bride of St. Francis, and that in those days songs in *praise* of poverty were as fashionable as devotion to St. Francis, the "Patriarch of poverty." Giotto was celebrated, too, for his joyous temper, for his witty and satirical repartees, and seems to have been as careful of his worldly goods as he was diligent in acquiring them. Boccaccio relates an anecdote of him, not very important; but as it contains several traits which are divertingly characteristic, we will give it here:—

"Fair and dear ladies!" (Thus the novelist is wont to address his auditory.) "It is a wondrous thing to see how oftentimes nature hath been pleased to hide within the most misshapen forms the most wondrous treasures of soul, which is evident in the persons of two of our fellow-citizens, of whom I shall now briefly discourse to you. Messer Forese da Rabatta, the advocate, being a personage of the most extraordinary wisdom, and learned in the law above all others, yet was in body mean and deformed, with, thereunto, a flat, currish (*ricagnato*) physiognomy; and Messer Giotto, who was

not in face or person one whit better favoured than the said Messer Forese, had a genius of that excellence, that there was nothing which nature (who is the mother of all things) could bring forth, but he with his ready pencil would so wondrously imitate it, that it seemed not only *similar*, but *the same*: thus deluding the visual sense of men, so that they deemed that what was only pictured before them did in reality exist. And seeing that through Giotto that art was restored to light which had been for many centuries buried (through fault of those who, in painting, addressed themselves to please the eye of the vulgar, and not to content the understanding of the wise), I esteem him worthy to be placed among those who have made famous and glorious this our city of Florence. Nevertheless, though so great a man in his art, he was but little in person, and, as I have said, ill-favoured enough. Now it happened that Messer Forese and Giotto had possessions in land in Mugello, which is on the road leading from Florence to Bologna, and thither they rode one day on their respective affairs, Messer Forese being mounted on a sorry hired jade, and the other in no better case. It was summer, and the rain came on suddenly and furiously, and they hastened to take shelter in the house of a peasant thereabouts who was known to them; but the storm still prevailing, they, considering that they must of necessity return to Florence the same day, borrowed from the peasant two old, worn-out pilgrim-cloaks and two rusty old hats, and so they set forth. They had not proceeded very far when they found themselves wet through with the rain, and all bespattered with the mud; but after a while, the weather clearing in some small degree, they took heart, and from being silent they began to discourse of various matters. Messer Forese having listened awhile to Giotto, who was in truth a man most eloquent and lively in speech, could not help casting on him a glance as he rode alongside, and considering him from head to foot thus wet, ragged, and splashed all over, and thus mounted and accoutred, and not taking his own appearance into account, he laughed aloud. 'O Giotto,' said he, jeeringly, 'if a stranger were now to meet us, could he, looking on you, believe it possible that you were the greatest painter in the whole world?' 'Certainly,' quoth Giotto, with a side glance at his companion, 'certainly: if looking upon your worship he could believe it possible that you knew your A B C!' Whereupon Messer Forese could not but confess that he had been paid in his own coin."

This is one of many humorous repartees which tradition has preserved, and an instance of that readiness of wit—that *prontezza*—for which Giotto was admired; in fact he seems to have presented in himself, in the union of depth and liveliness, of poetical fancy and worldly sense, of independent spirit and polished suavity, an epitome of the national character of the Florentines, such as Sismondi has drawn it. We learn, from the hyperboles used by Boccaccio, the sort of rapturous surprise which Giotto's imitation of life caused in his imaginative contemporaries, and which assuredly they would be far from exciting now; and the unceremonious description of his person becomes more amusing when we recollect that Boccaccio must have lived in personal intercourse with the painter, as did Petrarch and Dante. When Giotto died in 1336, his friend Dante had been dead three years; Petrarch was thirty-two, and Boccaccio twenty-three years of age. When Petrarch died in 1374, he left to his friend, Francesco da Carrara, Lord of Padua, a Madonna, painted by Giotto, as a most precious legacy, "a wonderful piece of work, of which the ignorant might overlook the beauties, but which the learned must regard with amazement." All writers who treat of the ancient glories of Florence—Florence the beautiful—Florence the free—from Villani down to Sismondi, count Giotto in the roll of her greatest men. Antiquaries and connoisseurs in art search out and study the relics which remain to us, and recognise in them the dawn of that splendour which reached its zenith in the beginning of the sixteenth century: while to the philosophic observer Giotto appears as one of those few heaven-endowed beings, whose development springs from a source within—one of those unconscious instruments in the hand of Providence, who, in seeking their own profit and delight through the expansion of their own faculties, make unawares a step forward in human culture, lend a new impulse to human aspirations, and, like the "bright morning star, day's harbinger," may be merged in the succeeding radiance, but never forgotten.

Before we pass on to the scholars and imitators of Giotto, who during the next century filled all Italy with schools of art—we may here make mention of one or two of his contemporaries, not so much for any performances left behind them, but because they have been commemorated by men more celebrated than themselves, and survive embalmed in their works as "flies in amber." Dante has mentioned, in his 'Purgatorio,' two painters of the time, famous for their miniature illustrations of Missals and MSS. Before the invention of printing, and indeed for some time after, this was an important branch of art: it flourished from the days of Charlemagne to those of Charles V., and was a source of honour as well as riches to the laymen who practised it. Many, however, of the most beautiful specimens of illuminated manuscripts are the work of the Benedictine monks, who laboured in the silence and seclusion of their convents, and who yielded to their community most of the honour and all the profit: this was not the case with Oderigi, whom Dante has represented as expiating in purgatory his excessive vanity as a painter, and humbly giving the palm to another, Franco Bolognese, of whom there remains no relic but a Madonna, engraved in Rosini's 'Storia della Pittura.' He retains, however, a name as the founder of the early Bolognese school. The fame of Buffalmacco as a jovial companion, and the tales told in Boccaccio of his many inventions and the tricks he played on his brother-painter the simple Calandrino have survived almost every relic of his pencil. Yet he appears to have been a good painter of that time, and to have imitated, in his later works, the graceful simplicity of Giotto:[1] he had also much honour and sufficient employment, but having been more intent on spending than earning, he died miserably poor in 1340.

Cavallini studied under Giotto at Rome, but seems never to have wholly laid aside the Greekish style in which he had been first educated. He was a man of extreme simplicity and sanctity of mind and manners, and felt some scruples in condemning as an artist the Madonnas before which he had knelt in prayer: this feeling of earnest piety he communicated to all his works. There is by him a picture of the Annunciation preserved in the church of St. Mark at Florence, in which the expression of piety and modesty in the Virgin, and of reverence in the kneeling angel, is perfectly beautiful: the same devout feeling enabled him to rise to the sublime in a grand picture of the Crucifixion which he painted in the church of Assisi, and which is reckoned one of the most important monuments of the Giotto school—the resignation of the divine sufferer,

* An elegant little figure of St. Catherine, attributed to Buffalmacco, is engraved in Rosini, p. 52. A picture of St. Ursula, an early work of the same painter, is quite Byzantine in style. The Frescoes in the Campo Santo at Pisa, so long attributed to him, are by another hand. (See Kugler and Rumohr.)

the lamenting angels, the fainting Virgin, the groups of Roman soldiers, are all painted with a truth and feeling quite wonderful for the time. Engravings after Cavallini may be found in Ottley's 'Early Italian School,' and in Rosini (p. 21). He became the pupil of Giotto when nearly forty years old, and survived him only a short time, dying in 1340. With Cavallini begins the list of painters of the Roman school, afterwards so illustrious. Among the contemporaries of Giotto we must refer once more to Duccio of Sienna. Though an established painter in his native city when Giotto was a child, his later works show that the influence of that young and daring spirit had given a new impulse to his mind. His best picture, still preserved, and described with enthusiasm in Kugler's 'Handbook,' was painted in 1311. Duccio died very old, about 1339.



ECONOMICAL USES OF THE MAPLE.

Among the trees which abound in the magnificent forests of North America the Maple deserves notice on account of the large variety of uses to which it is applied in the arts of life.

There are about fourteen species of this tree worthy of enumeration of which one half are European and the other half American. The Maples, in general, are lofty and beautiful trees. Capable of enduring an intense degree of cold, they form, in northern countries extensive forests, which seem to occupy a medium place between those of the Beech, the Spruce, the Larch, and the Fir, on one side, and those of the Chestnut and the Oak on the other. In America the Maple is found principally between the latitudes of 43° and 46°. As we do not propose to enter upon the botanical characters of the different species, it will not be necessary to classify them in any particular order; but it will suffice to take the useful applications, one by one, and enumerate the species which yield them. We will begin with the Maple in respect of the wood or timber which it yields; taking as our principal guides Michaux ('Arbres Forestières de l'Amerique Septentrionale') and Loudon ('Arboretum et Fruticetum Britannicum').

The Sugar-Maple, whose name is derived from a circumstance which we shall notice further on, is one of the finest of this genus. In America it sometimes reaches a height of seventy or eighty feet, and is a very noble-looking tree. It has been estimated that in the northern parts of the states of Pennsylvania and New York there are ten millions of acres which produce these trees, in the proportion of about thirty to an acre.

In the more Southern states it is nearly unknown The wood, when cut, is white: but after being wrought and exposed some time to the light, it takes a rosy tinge. Its grain is fine and close, and when polished it has a silky lustre. In the States of Vermont, New Hampshire, and Maine, where the oak is not plentiful, the timber of the sugar-maple is substituted for it, in preference to that of the beech, the birch, and the elm. When perfectly seasoned, which requires a period of two or three years, it is used by wheelwrights for axle-trees and spokes and similar purposes. It is also employed in the manufacture of Windsor chairs. In the country, where the houses are wholly of wood, this kind of timber is used for the framework; and in the district of Maine it is preferred to beech for the keels of vessels, as it furnishes longer pieces. Used in combination with beech and yellow pine, it forms the lower frame of ships, immersed in the water.

The Red-flowering or Scarlet Maple is another American species, known in different parts of the United States by the various names of Swamp Maple, Soft Maple, and the two others just mentioned It is found very extensively from Canada in the north to Florida in the south, located generally in swamps or on the borders of creeks. There are in Philadelphia and New Jersey extensive marshes called "Maple Swamps," exclusively covered with it; the trees rising to a height of seventy or eighty feet, and measuring three or four feet in diameter. It has been observed that in descending towards the mouths of the large American rivers, the red-maple is the last tree found in the swamps, the tree diminishing in size as the soil becomes impregnated with salt. The wood of this tree is applied to various uses in America. It has a fine and close grain, is easily wrought in the lathe, and acquires by polishing a glossy and silken surface. It is very largely used in the manufacture of Windsor chairs. The pieces are prepared in the country; and so considerable is the demand, that boats laden with them frequently arrive at New York and Philadelphia, where extensive factories are carried on, the manufactured articles being furnished to the neighbouring towns, and also exported to the West Indies. The whole framework of japanned chairs in America is made of this wood, the backs being made of hickory. The frame, the nave, and the spokes of spinning-wheels are made of the red maple. At Philadelphia it is the only wood used for saddle-trees; and in the country it is preferred to most others for yokes, shovels, and wooden dishes, which are brought to market by the country-people, and purchased by the dealers in wooden-ware. Before mahogany became generally fashionable in the United States, the best furniture in use was made of the red maple; and bedsteads are still made of it, which are said to equal the finest mahogany in richness and lustre. It sometimes happens that in very old trees of this species the grain, instead of following a perpendicular direction, is undulated, whence it obtains the name of "curled maple;" and from the toughness and strength which this texture superadds to the natural lightness and elegance of

the wood, such specimens are much sought after for making the stocks of fowling-pieces and rifles.

The White Maple, like the Red, is an American species. It is found on the banks of all the rivers which flow from the mountains of the interior to the ocean; and is particularly abundant in the Western states, about the Ohio and its tributary streams. "There," says Michaux, "sometimes alone, and sometimes mingled with the willow, which is found along all these waters, it contributes singularly by its magnificent foliage to the embellishment of the scene. The brilliant white of the leaves beneath forms a striking contrast with the bright green above, and the alternate reflections of the two surfaces in the water heightens the beauty of this wonderful moving mirror, and aids in forming an enchanting picture, which, during my long excursions in a canoe in these regions of solitude and silence, I contemplated with unwearied admiration." Unlike the Red Maple, the White species is found on the banks of such rivers only as have limpid waters and a gravelly bed, and never in swampy ground. The wood of this species is very white and of a fine grain; but it is softer and lighter than that of the other species. Wooden bowls are sometimes made of it; and cabinet-makers frequently employ it in their operations.

The Sycamore Maple, or Great Maple, is a species which grows abundantly in various parts of Europe, such as Switzerland, Germany, and Italy. Its timber, when the tree is young, is white: but as it grows older the tint changes to yellow or even brown. It is compact and firm, without being very hard; of a fine grain, sometimes veined: susceptible of a high polish; and easily worked either at the bench or the lathe. In France and Germany this wood is much sought after by wheelwrights, cabinet makers, turners, sculptors in wood, manufacturers of musical-instruments—especially of violins, and makers of toys and other small wares. It is also used for pestles, tables, rollers, spoons, plates, and a considerable variety of household articles; as likewise for gun-stocks. The wood of the British trees belonging to this species is used by our manufacturers for many of the purposes here enumerated, as well as for cider-presses. The Scotch wooden dishes and spoons, so much used in bygone times, were frequently made of this wood.

The Rose leaved Maple, a native of the Jura Alps and the Pyrenees, yields a very hard and compact kind of wood, free from sap-wood, not easily split, and so homogeneous in its texture, that it is almost impossible to distinguish the annual layers: it is white lightly shaded with lemon-colour, sometimes exhibiting flashes or shades of red, and it takes a fine polish. This wood is much used by wheelwrights in France.

There are other species whose wood is more or less employed in the arts, but which may be dismissed in a few words; such as the round-leaved maple, a native species of North America, of which the fine, white, tough, and close-grained wood is much used by the Americans, and of which the slender branches are employed by the native Indians to make the hoops of their scoop-nets, used for taking salmon at the rapids and in the contracted parts of rivers; the Montpelier maple, found in southern France, Spain, and Italy, the hard and heavy wood of which is used in France by turners and cabinet-makers; and the common or field maple, found in various parts of Europe and Asia, and the wood of which is used for similar purposes as that of the species just named.

But besides the applications of maple-wood for purposes of strength and service, there are features presented by several of the species which admirably qualify them for use as ornamental or 'fancy' woods, either in the bulk or more frequently in the form of a thin veneer laid on a foundation of less valuable wood. We have before alluded to an undulating arrangement which is sometimes observable in old trees of the red maple species, and of the strength which this structure gives to the wood. It is said that not more than one tree in a hundred of the species presents these peculiarities; but, when they do occur, the specimens are much prized for the ornamental character of the wood. The serpentine direction of the fibre, which renders the wood difficult to split and to work, produces, in the hands of a skilful mechanic, the most beautiful effects of light and shade. These effects are rendered more striking if, after smoothing the surface of the wood with a double-ironed plane, it is rubbed with a little sulphuric acid, and afterwards with linseed oil. On examining it attentively, the varying shades are found to be owing to the irregular reflection of light, and are more sensibly perceived if the surface be viewed in different directions by candlelight.

The sugar-maple, in like manner, yields wood which is highly valued for purposes of ornament. This wood exhibits two accidental forms in the arrangement of the fibre: of which the first consists in undulations like those in the curled wood of the red maple; while the second arrangement, found only in old trees that are still sound, and which appears to arise from an inflexion of the fibre from the circumference towards the centre, produces minute spots, sometimes contiguous and at other times wide apart. The more numerous the spots, the more beautiful and the more esteemed is the wood. This variety is known to our cabinet-makers by the name of 'bird's-eye maple,' and is much used for inlaying and veneering. The finest effect is produced when the logs are cut with the saw parallel to the concentric circles of the wood.

Nearly all the kinds of maple-wood possess sufficient beauty to be used as veneers, but the two preceding are the most prized. Specimens of the large-leaved maple have, indeed, been seen, of which the wood exhibited a grain scarcely inferior in beauty to the finest satin-wood. Many kinds exhibit knots, spots, and curls, which cause them to be used in bulk or solid pieces for ornamental purposes. For instance, the root of the sycamore-maple often exhibits a veined texture which leads to its employment in curious articles of cabinet-work: the roots, too, of the Italian or Opal maple, especially of those trees which have been often cut, are very much sought after on account of their hardness, and their curious knots and blotches, which render them suitable for making snuff-boxes and similar articles; and lastly, the roots of the common or field maple are similarly sought for and employed.

In a country like England, where coal forms the great bulk of the fuel employed—not only for domestic use, but also in manufactures—the relative qualities of different woods as fuel, and as materials for charcoal, are not so much attended to as in most other countries; and consequently we find, in descriptions of foreign trees written by foreigners, that the value of any particular tree as fuel is generally entered among its qualities. Such is the case with respect to the maple. A few examples will suffice. The charcoal obtained from the sugar-maple is said to be preferred, in the forges of Vermont and Maine, to that obtained from any other kind of wood: the trees of this species in the States just named yield from their wood charcoal one-fifth heavier than that from similar trees grown farther south—a fact which shows the effect of climate. The wood of the Sycamore-maple is highly prized as fuel, both for the quantity of heat which it gives out, and the time that it continues burning: in the state both of wood and of charcoal, it is superior to beech as a fuel. Michaux says that the hatters of Pittsburg prefer the charcoal of the white maple wood to that of any other for heating their

boilers, under the impression that it affords a more uniform and durable heat. The wood of the common maple, whether in its natural state or as a charcoal, makes excellent fuel; whereas that of the red species has a bad reputation in America in respect to its burning qualities.

The leaves and young shoots of the maple are often brought more or less into use. Thus, Pallas informs us, while treating of the Tartarian maple, that the Calmucks boil the fruit in water, and afterwards use it for food, mixed up with milk and butter. An American species, called the striped-bark maple, affords food to cattle in Nova Scotia, where the animals eat the leaves both in the green and dried state; and in spring, when the buds begin to swell, both horses and cattle are turned into woods to browse on the young shoots.

With respect to the manufacturing arts, the maple has hitherto chiefly been valuable in relation to the solid wood which constitutes the trunk; but it is not improbable that various useful applications will hereafter be made of the sap or juice. The cellular matter of the inner bark of the red maple, which is of a dusky red colour, yields by boiling a purplish colour, which becomes very dark blue on the addition of sulphate of iron: and this colour, mixed with a certain portion of alum in solution, is used in the provincial districts of America for dyeing black. The cellular integument of the white maple yields in a similar manner a black-dyeing material. The preparation of potash from the ashes of the sugar-maple is carried on most extensively in America, particularly in Upper Canada, in a manner which has been fully described by an eye-witness in our No. 573.

In a domestic point of view, the extraction of sugar from the juice of the maple is by far the most important application of the tree. From the sap of the Norway maple, sugar is prepared in Norway, Sweden, and Lithuania; thirty-five quarts of sap have been produced from one tree in eight days. The sycamore maple has been known to yield thirty-six quarts in five days, which gave about an ounce of sugar to a quart of sap; and in an experiment made by Sir T. D. Lauder on a tree of this kind in 1816, 116 parts of juice or sap yielded one of sugar. Most of the other species yield saccharine sap more or less freely; but all are exceeded in this respect by the sugar-maple, which has derived its name from the abundance of this sap found in it and which is a tree of great importance to Canadian emigrants. The whole circumstances attending the collection of the sap and the manufacture of the sugar from it, have been so fully detailed in our Nos. 194 and 300, as to preclude the necessity for any further description here.

SONOROUS GRANITE AND SAND-HILLS.

In the tropical regions of both continents there are certain phenomena which have given rise to much speculation, both among superstitious natives, and among European men of science who have visited the districts in question. Masses of granite rock, both hewn and unhewn, and hills of loose sand, have been heard to emit sounds, either at certain hours of the day, or else when agitated or disturbed under peculiar circumstances. The attention of scientific men had been directed to the matter some years back; but very recently the late lamented Sir Alexander Burnes met with a similar sonorous hill in Afghanistan.

The statue of Memnon, still existing in a mutilated state, in Egypt, was celebrated among the ancients for the vocal sounds—or sounds so deemed—emitted by it. One of the classical writers states that the statue looked towards the east, and that it spoke as soon as the rays of the rising sun fell upon its mouth; another mentions it as emitting only a single sound; a third alluded to several different tones or sounds; and a fourth states that the statue, which is dedicated to the sun, "emits sounds every morning at sunrise, which can be compared only to that of the breaking of the string of a lyre." When such men as Pausanias, Strabo, and Juvenal mention these emissions of sound, it is pretty certain that there must have been some foundation for the report; but in the absence of any natural explanation of the causes, mystery soon enveloped the whole. The simple sounds emitted were by degrees magnified into intelligible words, and even into an oracle of seven verses; and the Egyptian priests appear to have made use of this agency to maintain an ascendency over the people.

When modern travellers became acquainted with this statue, much discussion arose as to whether the sounds really heard were due to any natural cause, or were produced by some contrivance of the priests. M. Dussaulx offers an opinion that, "the statue being hollow, the rays of the sun heated the air which it contained; and this air, issuing at some crevice, produced sounds to which the priests gave their own interpretation." This probably approaches pretty nearly to the truth; but other writers, preoccupied with the idea that the whole was an artificial arrangement, have set themselves the task of deciding how such an effect might be produced. M. Langles conceives that the sounds might be produced by a series of hammers, which struck either the granite itself, or sonorous stones, like those which have long been used in China for musical-instruments. M. Salverte goes much farther than this. He supposed that there might be adapted to these hammers a *clepsydra*, or water-clock, or some other instrument, fitted to measure time, and so constructed as to put the hammers in motion at sunrise. He even tries to show how the hammers themselves might be made to act, by the following conjecture:—Between the lips of the statue, or in some less remarkable part of it, concealed from view, he supposed an aperture to be made, containing a lens or a mirror capable of focalizing the rays of the rising sun upon one or more metallic levers, which by their expansion put in motion the series of hammers.

Besides the large amount of improbability attached to the construction of such a complex piece of scientific apparatus in such remote times, and the absence of any evidence, either written or monumental, in support of it—there is this obstacle, that the position of the apparatus, which might be effective at one part of the year, could not be so at another, on account of the different parts of the horizon at which the sun rises being farther north in summer than in autumn, and in autumn than in winter. It is also plain that the mutilation of the statue must have destroyed the apparatus; and yet the sound is still heard. Sir A. Smith, in the year 1821, examined the statue, and states that at six o'clock in the morning he distinctly heard sounds emitted; but he thinks they emanate from the pedestal, and not from the statue.

Sir David Brewster, in his 'Letters on Natural Magic,' groups certain items of information which seem to point to the true explanation of the cause of these sounds. Baron Humboldt in Colombia, and MM. Jamard, Jollois, and Devilliers in Upper Egypt, happened about the same time to meet with masses of granite from which sounds were heard. Humboldt thus speaks:—"The granitic rock on which we lay is one of those where travellers on the Orinoco have heard from time to time, towards sunrise, subterraneous sounds resembling those of the organ. The missionaries call these stones *loxas de musica*. 'It is witchcraft,' said our young Indian pilot. We never ourselves heard these

mysterious sounds, either at Carichana, Vieja, or in the Upper Orinoco; but from information given us by witnesses worthy of belief, the existence of a phenomenon that seems to depend on a certain state of the atmosphere cannot be denied. The shelves of rocks are full of very narrow and deep crevices; they are heated during the day to about 50°; and I often found their temperature at the surface during the night at 39°, the surrounding atmosphere being at 28°. It may easily be conceived that the difference of temperature between the subterraneous and the external air attains its maximum about sunrise. May not these sounds of an organ, then, which are heard when a person sleeps upon the rock, his ear in contact with stone, be the effect of a current of air that issues out through the crevices? Does not the impulse of the air against the elastic spangles of mica that intercept the crevices contribute to modify the sounds? May we not admit that the ancient inhabitants of Egypt, in passing incessantly up and down the Nile, had made the same observation on some rocks of the Thebaid, and that the music of the rocks there led to the jugglery of the priests in the statue of Memnon?"

The last suppositive case put by Humboldt received singular support at the very time, but without the mutual knowledge of the parties, by the French travellers in Egypt. These gentlemen heard, at sunrise, in a monument of granite situated near the centre of the spot on which the palace of Carnac stands, a sound resembling that of a *breaking string*, precisely the expression used by Pausanias in speaking of the Memnon statue. They regarded these sounds as arising from the transmission of rarefied air through the crevices of a sonorous stone.

From all the evidence collected it is now inferred that granitic rocks do emit sounds, when the external temperature is greatly different from that of the crevices in the granite; that the priests of Egypt, cognizant of the fact to a certain degree, caused the statue of Memnon to be sculptured from a block of granite which had been heard to emit such sounds; that the mouth of the statue was placed opposite to the sun to give an apparent but mystical connection between them; and that the simple sounds had been magnified in importance to suit the purposes of the priests.

The noises heard from sandy mountains, though probably different in their source, have been equally the objects of superstition and wonder. In that part of Arabia called Arabia Petræa, near the northern end of the Red Sea, is a mountain from which very singular sounds are heard. No European appears to have visited it before M. Seetzen, who wrote concerning it in 1812. He says:—"For two years I had heard it spoken of by the Greeks, first at the convent of Sinai, and afterwards at Suez; but the account which was given me of it was accompanied with so many fabulous recitals, that I was led to suppose it an invention of the merchants. When I obtained further information at Wady el Nachel, it not only confirmed these first accounts, but added to them new prodigies: such as that under the mountain there existed a Greek convent, and that the subterranean noise was that of the Nakous, or call to prayers. (The Nakous is a sort of long narrow rule, suspended in a horizontal position, which the priest strikes with a hammer, and the sound of which is heard at a distance.) It was also stated that a Greek, who had been dead for some time, had seen the mountain open, and had descended into the subterranean convent, where he found fine gardens and delicious water; and in order to give proof of this descent he had brought to the upper world some fragments of consecrated bread which he had received."

In order to see what had really given rise to these marvellous tales, Seetzen visited the mountain. He found it a bare but majestic rock of hard sandstone, inscribed with numerous names in the Greek, Arabic, and Koptic languages, which showed that it had often been visited. Upon two sides the mountain presented surfaces so inclined, that the white and slightly adhering sand by which it was covered could scarcely support itself, but slid down with the slightest motion, or even when the burning rays of the sun destroyed its cohesion. These two sandy declivities were about a hundred and fifty feet in height.

Seetzen first heard the sound shortly after noon. He climbed with great difficulty to a height of seventy or eighty feet, and stopped at a spot where the pilgrims were in the habit of placing themselves to listen. In climbing he heard the sound from beneath his knees, which made him think that the sliding of the sand was the cause, and not the effect, of the sounds. The sounds were heard at about one o'clock, then about three o'clock, and then a third time; and seemed to Seetzen to have great analogy to those of a humming-top, or sometimes to those of an Eolian harp. To test the truth of his conjecture that the motion of the sand was the cause of the sound, he climbed to the greatest height which he could reach, and slid down to the bottom as rapidly as he could, disturbing the sand at the same time with his hands and feet. The effect produced was so great, and the sand in rolling made so loud a noise, that the ground seemed to tremble, and Seetzen owns that he should have been afraid if he had not himself planned the experiment.

Mr. Gray, of Oxford, and Lieutenant Wellstead have also described this sand-hill. The first time that Mr. Gray visited this place, he heard at the end of a quarter of an hour a low continuous murmuring sound beneath his feet, which gradually changed into pulsations as it became louder, so as to resemble the striking of a clock. In five minutes it became so strong as to detach the sand. He returned to the spot on the following day, and remained there an hour, during which he heard the sound much louder than on the preceding day.

Mr. Gray offers no solution of the cause of the sound, but M. Seetzen attributes it mainly to the motion of the particles of very dry sand over each other in descending. This seems to agree with the account given by Sir A. Burnes of a sand-hill in Afghanistan. It is situated in the vicinity of Cabul, and is called the Reg-Ruwan, or "moving-sand." Two ridges of hills, detached from the main line of the Hindu-Koosh, run in and meet each other; and at this spot is a hill, about four hundred feet high, and whose sides present an angle of about 40°, covered with a surface of very pure and dry sand. When this sand is set in motion by a body of people who slide down it, a sound is emitted. Sir A. Burnes says, "On the first trial we distinctly heard two loud hollow sounds, such as would be given by a large drum. On two subsequent attempts we heard nothing, so that perhaps the sound requires to be for a time settled before the curiosity is displayed. There is an echo in the place, and the inhabitants have a belief that the sounds are only heard on Friday, when the Saint of Reg-Ruwan, who is interred hard by, permits. The locality of the sand is remarkable, there being none other in the neighbourhood."

It seems scarcely susceptible of a doubt that the superficial stratum of sand is in both these cases the cause of the sounds; since the declivity is in both instances such as to allow the descent of the sand with a very slight impulse. The sound may result from the rolling of the particles of sand one over another; concentrated, it may be, by echoes from the neighbouring hills; for it would appear from the description that in both cases the sand-covered hill is adjacent to others which might return an echo.



[Amoy.]

AMOY.

AMOY is a small island near the coast of China, with a town of the same name, lying towards the south-eastern extremity of the province of Foo-Kien. It is in 24° 45′ N. lat. and 118° E. long. In Mandarin dialect the name of the place is Hea-mun, which is pronounced by the natives Ha-moy.

The district directly adjacent to this flourishing town, the emporium of the commerce of the province, is one of the most barren in all China; but this character does not seem to extend very widely, as Lieutenant Murray, in his work 'Doings in China,' says:—'The country in the immediate vicinity of Amoy is miserably barren; hence the means of subsistence are scanty and expensive. A few miles distant, however, the soil is rich and affords abundant supplies. Green peas, potatoes, and other European vegetables were brought to market in great abundance when the general panic had ceased." Notwithstanding this serious disadvantage, the merchants of Amoy are among the most wealthy and enterprising in the Chinese empire; they have formed connexions all along the coast, and have established commercial houses in many parts of the Eastern Archipelago. Most of the colonists in Formosa emigrated from the district of Amoy, with capital supplied by its merchants; and in proportion as that island has flourished, so has Amoy increased in wealth and importance.

During the south-west monsoon, the merchants of Amoy freight their vessels at Formosa with sugar, which they sell at various ports to the northward, returning home with cargoes of drugs. They maintain commercial relations with Manilla, as well as with Tonquin and Cochin-China: they annually employ forty large junks in trading with Bankok, the capital of Siam. Junks of the largest class—some of them eight hundred tons burden—go to Borneo, Macassar, Java, and the Soo-loo islands; and many of them annually visit Sincapore, in order to procure goods of British manufacture.

This port has not always been closed against European vessels. According to the records of the East India Company, "the King of Tywan, on taking Amoy in 1675, issued a proclamation inviting both Chinese and foreign merchants to trade thither, exempting them from the payment of all duties for three years. Many vessels in consequence resorted to the port, but the exemption was speedily revoked. In 1681 the town was taken by the Tartars, but Europeans were still allowed to trade thither, and continued to do so until 1734, when the exactions of the Mandarins deterred them from continuing so unprofitable an intercourse; and when an English ship went there ten years after, many vain endeavours and much fruitless discussion were employed to induce the Chinese to trade, so that the vessel was obliged to proceed to Bengal for a cargo."

The ship Amherst visited Amoy in 1832 with no better success: it appears, however, that the obstacles to her trading all proceeded from the authorities and not from the people, by whom our countrymen were received in the most friendly manner.

The late expedition has extended our knowledge of Amoy, having been captured by our troops. Dr. Macpherson says of it:—"Amoy is a principal third class city of China; it has an excellent harbour, and from its central situation is well adapted for commerce. It is a great emporium of trade, and has constant communication, not only with the neighbouring states, but also with Singapore and other settlements in the straits. The city is about eight miles in circumference: it is surrounded in part by a wall, and nearly its whole length by the inner harbour. Its population is fluctuating, from the major portion being so frequently absent on mercantile pursuits. It is at all times much infested by native robbers, who come in boats and attack the inhabitants at night. These daring marauders paid repeated visits to the city even while it was in possession of our troops, and plundered the temples and public establishments of much valuable property. The citadel is about a mile in circum-

ference. It entirely commands the suburbs and inner town, and is surrounded by a wall which is occasionally turreted, and varies in height from twenty to thirty-six feet. In this citadel were several extensive granaries well filled, arsenals containing enormous quantities of jingalls, wall-pieces, matchlocks, military clothing, shields, bows and arrows, spears and swords of all descriptions, besides extensive magazines of powder and material for constructing it. There was also a foundry, with moulds for casting guns. But few war-junks were seen, the Chinese admiral having shortly before our visit proceeded on a cruise with the fleet. Large quantities of timber and naval stores were found, and several war-junks were on the stocks; one two-decker, moulded after the fashion of ours, and carrying thirty guns, was ready for sea. . . . . From the point of entrance into the inner harbour, the great sea-line of defence extended in one continued battery of granite upwards of a mile. This battery was faced with turf and mud several feet in thickness, so that at a distance no appearance of a fortification could be traced. The embrasures were roofed, and the slabs thickly covered with turf, so as to protect the men while working their guns. This work mounted about one hundred guns, and it terminated in a high wall, which was connected with a range of rocky heights which run parallel to the beach. The entrance into the harbour is by a channel six hundred yards across, between the island of Koolangsoo and Amoy. On each side of this passage there were also strong fortifications."

Sir Hugh Gough has given a few additional particulars in his despatch. He says—"The outer town is divided from the city by a chain of rocks, over which a paved road leads through a pass that has a covered gateway at its summit. The outer harbour skirts the outer town, while the city is bounded in nearly its whole length by the inner harbour and an estuary which deeply indent the island. Including the outer town and north-eastern suburb, the city cannot be much less than ten miles in circumference; and that of the citadel, which entirely commands this suburb and the inner town, though itself commanded by the hills within shot range, is nearly one mile."

The Chinese were somewhat vain of their fortifications at Amoy. "Their batteries," says Dr. Macpherson, "having on two former occasions *driven* off the barbarian ships, they were by the Chinese considered impregnable. The capture of them, therefore, must have been a sad blow to their pride. Their magazines were blown up; their arsenals and their contents utterly destroyed; their best war-junks and dockyards were burnt; upwards of five hundred guns of various calibre rendered unserviceable, and their fortifications experienced much the same fate as did those of the Bocca Tigris."

Both Sir Hugh and Dr. Macpherson remark on the greater degree of confidence reposed in us here by the natives than was shown at other places. The Doctor says—"Several of the merchants never left their shops: these showed far greater acquaintance with European customs and manners than is even to be found at Canton. They could enumerate the productions and describe the government of many places in the Indian Archipelago. But the name of Singapore was familiar to all, and produced many remarks in favour of the British nation. There, they said, property is always safe: no duty is paid, and there are no mandarins to squeeze." These are favourable indications towards our future intercourse with them.

Having on a former occasion given an account of Macao and Canton (Nos. 533 and 535), and more recently of Hong-Kong (No. 688), Ning-po (No. 689), Shang-hae (No. 701), and Foo-choo-foo (No. 704), this notice of Amoy completes the list of places which have been opened to the exertions of British industry: and we trust that the blessings arising from an intercourse with us, and the consequent knowledge attained of a more elevated religion, a higher morality, and a more perfect civilization, may ultimately compensate the Chinese for the severe sufferings endured by them in the recent contest.

PARKS FOR THE PEOPLE—THE DERBY ARBORETUM.

The time seems to be approaching when our busy townsmen will have, if not green fields, at least a substitute for them, in or near the thickly-thronged haunts of industry. During the rapid progress of manufactures since the commencement of the present century, men scarcely dreamed of the changes which were going on around them. By silent steps the radius of each one of our great towns has gradually increased, till those streets which were formerly in the margin are now hemmed in all around, and spots which were formerly fields are now included within the inhabited circle. This has arisen, not only from the natural increase of population in the towns, but from the migration thither of part of the agricultural population. In some towns this increase of masses of houses has gone on at such an astonishing rate, that public attention begins now to be forcibly directed to the probable consequences which will ensue to the health of the inhabitants. In London, for example, it is now a tiring walk to reach green fields from districts which in the last generation were fields themselves. The open and airy spots are becoming choked up with houses, one after another, and the public are thus deprived of their breathing-places.

When the tenure of land in England is considered, it is obvious that this system cannot be obviated except by government grant or private liberality. If a man possesses a piece of ground, he will dispose of it in the way most conducive to his own interests, either as building-ground or for some other purpose, according to the circumstances of the case. It is of no use to expect that the ground-landlord will lay by a part of his plot of ground as a public exercise or pleasure-ground; he, as an individual, does not do so, and will not do so. It must be by efforts of a more distinct and decided nature that the end will be obtained.

There have been developed, within a recent period, three methods of carrying out the desirable object: by parliamentary enactment in the management of enclosure bills; by state grants; and by private liberality. With respect to the first, a resolution was passed by the House of Commons in 1837, to the effect that, in all new enclosure bills, some portions of the waste lands about to be appropriated should be set apart for the healthful recreation of the inhabitants of the neighbouring towns and villages. Since that resolution was carried, all the enclosure bills introduced into parliament have had provision made for carrying out the prescribed intention; and future generations will reap most valuable benefits from this arrangement, by which little green spots, available to all the inhabitants of a town or village, will be left permanently unoccupied by houses.

As to the efforts of private individuals to aid in this object, nothing perhaps has yet been done so striking as that which the town of Derby exhibits. The family of the Strutts, who have for nearly a century been distinguished manufacturers in that town, have grown in importance with the growth of the town, and have been universally esteemed for their liberality. One of the living members of the family, Mr. Joseph Strutt, presented to the corporation of the town, as

trustees on the part of the inhabitants, a piece of ground, which he had caused to be laid out as a park or pleasure-ground. This park received the designation of the "Derby Arboretum," and was publicly opened on the 16th of September, 1840. The whole ceremony of the opening was replete with interest, as exhibiting a remarkable and liberally-construed compact between the donor and the receivers of the gift.

On the morning of the festive day all business was suspended in Derby, and all the corporate officers met in council. Mr. Strutt addressed them in their corporate capacity: he alluded to the increase in the trade and population of the town; to the selection of Derby as a central station for the Midland Counties, the North Midland, and the Birmingham and Derby railways; and to the spread of information and intelligence among the people. But he also said, that no opportunity had been afforded of retaining, for the inhabitants generally, public walks and grounds. He proceeded to state that, with a view of remedying the defect, he had appropriated eleven acres of land on the southern side of the town, which he had caused to be laid out with paths and walks, and planted with trees and shrubs, for the use of the inhabitants. He then explained the manner in which he proposed that the corporation should manage the Arboretum, in respect of hours of admission, guardianship, &c.; and pointed out the provision which he had made for the stocking and supply of the grounds. He then made an observation well worthy of being recorded for its enlarged liberality:—"It has often been made a reproach to our country, that in England collections of works of art, and exhibitions for instruction or amusement, cannot, without danger of injury, be thrown open to the public. If any ground for such a reproach still remains, I am convinced that it can be removed only by greater liberality in admitting the people to such establishments; by thus teaching them that they are themselves the parties most deeply interested in their preservation, and that it must be the interest of the public to protect that which is intended for the public advantage. If we wish to obtain the affection and regard of others, we must manifest kindness and regard towards them; if we seek to wean them from debasing pursuits and brutalizing pleasures, we can only hope to do so by opening to them new sources of rational enjoyment. It is under this conviction that I dedicate these gardens to the public; and I will only add, that as the sun has shone brightly on me through life, it would be ungrateful in me not to employ a portion of the fortune which I possess in promoting the welfare of those amongst whom I live, and by whose industry I have been aided in its acquisition."

After the presentation of the deed of settlement and the various documents relating to the Arboretum, the whole assemblage went in procession from the town-hall to the spot itself, to take formal possession. How they all walked in procession through the grounds; how volleys of cannon were fired; how the humble portion of the community danced away the afternoon in tents prepared for their reception; how tea-drinking succeeded; how a printing-press in the grounds printed off copies of Mr. Strutt's presentation address; how the returning multitude sang the 'Old English Gentleman' before the house of the donor; how the following day was devoted to the artisans' celebration of the gift, when six thousand persons were in the grounds; and how the third day was the children's jubilee, when all the children in the town had their holiday—all this, and much more, is held in pleasant remembrance by the inhabitants, and was fully recorded in the local newspapers at the time.

The plot of ground thus nobly given has been estimated in value, with the expense of laying out under the direction of Mr. Loudon, at between ten and twelve thousand pounds. It is situated on the Osmaston Road, in the southern part of the town. A neat lodge points out the entrance; and on passing within the gates, situated on the right of the lodge, we find a broad straight path extending onwards to a distance of five or six hundred feet, and smaller winding paths branching off to the right and left. If we follow either of these paths, say to the left, we find that it winds round pleasant hillocks or mounds, artificially constructed to diversify the scene; and occasionally small circular or oval beds or plots of ground are seen, planted with small shrubs. All the various walks lead into each other at different points, and together exceed a mile in length. Here and there, wherever a favourable position occurs, seats and benches are placed; and at three or four spots arbours, summer-houses, or pavilions are provided.

In a pamphlet which Mr. Loudon has published concerning the Arboretum, he has given his reasons for selecting (or recommending to the selection of Mr. Strutt) the existing arrangement, of a collection of trees and shrubs, foreign and indigenous, rather than a botanic garden or a mere pleasure-ground. In accordance with the plan adopted a considerable collection of trees has been planted; and in order to instruct the visitor as far as possible in the nature of the several trees, small tablets are fixed in the ground near each tree; each tablet consisting of a brick support, in which is imbedded a small porcelain slab, containing the inscription. The inscription in most cases gives the number of the tree (as referred to in a catalogue), the Latin or scientific name, the English name, the habitat, the full-grown height, the date of the introduction into England, &c.

At various parts of the ground are boards stuck up, bearing inscriptions which contrast favourably with the 'steel-trap' and 'spring-gun' announcements, so familiar to field ramblers. They run thus:—"This Arboretum has been given to the public for their advantage and enjoyment, and is placed under their special care and protection. It is hoped, therefore, that the public will assist in protecting the trees and shrubs and seats from injury, and in preserving the property which has been devoted to their use."

In one of the lodges attached to the Arboretum is a room for the temporary reception of visitors, and on a table in this room is deposited a "suggestion-book," or "visitors' remark-book," in which any visitors so disposed may write down any remarks which may be suggested to their minds respecting the improvement and condition of the Arboretum. The intention was evidently a good one, and a few remarks are to be found in the book worthy of attention, but unfortunately such is not the character of the great majority of the entries.

It would be a pleasant thing to believe that similar donations were made or about to be made by wealthy men, whether nobles or manufacturers. We do not know whether anything has been further done in the matter; but it was announced in the 'Westminster Review,' about two years ago:—"We have much pleasure in being able to confirm the statement made in some of the public papers, that the Duke of Norfolk has expressed his intention to give fifty acres of land to the town of Sheffield, for the benefit of its inhabitants. The plans, however, respecting it are not yet matured, as part of the ground is let, and will not be in hand till Michaelmas."

With respect to the granting by the State of plots of ground contiguous to busy towns for the purposes of public recreation, there are two ways in which such a thing could be effected; either by granting some of the crown lands, or purchasing ground from some

other parties. The Regent's Park will serve to exemplify one of these methods, while Primrose Hill and the new Victoria Park exemplify the other. Those who have been acquainted with the Regent's Park for many years will remember that two or three distinct portions of it have been thrown open to the public from time to time. The portion within the "inner circle" has been entirely leased off by the Crown (to whom it belongs) for years past; while the portion between the "inner" and the "outer" circles was either leased or locked up from the public. Some few years ago however, the fine gravel walk, with a large section of ground right and left of it, was thrown open to the public, and since then a still larger portion, comprising nearly all the north-west section, with paths and picturesque suspension-bridges, has been similarly placed at the public disposal. How cheerfully the gift has been received need not be told.

Primrose Hill affords an instance of purchase on the part of the Crown for the good of the people. It was, we believe, some three or four years ago contemplated to form a cemetery in this favourite Londoner's hill; but the government was induced to purchase it and the adjacent ground to the extent of nearly sixty acres at 300*l*. per acre, from Eton College and Lord Southampton, to whom it belonged. Arrangements are now being made for forming a picturesque and beautiful connection between the Regent's Park and the Hill.

The Victoria Park, now being laid out, occupies a site eastward of Bethnal Green, and is bounded on two of its sides by the Regent's Canal and the Lea Union Canal. It contains about two hundred and ninety acres, and is proposed to be laid out in a very elegant and park-like manner. If, as seems to be intended, handsome houses be built around it, and the more wealthy of the inhabitants of the eastern parts of the metropolis were to reside there, very great good would ensue to the whole neighbourhood. The expenses of this undertaking will be defrayed (or partly defrayed) by the sale to the Duke of Sutherland of the mansion in St. James's Park, once known as York House, but now Stafford House. The sale of the mansion and the purchase of the site for the Park have been sanctioned by an Act of Parliament expressly for that purpose.

That such Parks for the people may be provided in or near all our busy towns is an event to be hoped for by all well-wishers of the working community.

England in the Time of the Saxons.—It is a remarkable fact, and one which has scarcely been sufficiently adverted to, that, with very few exceptions indeed, all the towns, and even the villages and hamlets, which England yet possesses appear to have existed from the Saxon times. This is in general sufficiently attested by their mere names, and there is historical evidence of the fact in a large proportion of instances. Our towns and villages have become individually larger, in most cases, in the course of the last eight or ten centuries; but in all that space of time no very great addition has been made to their number. The augmentation which the population and wealth of the country have undergone, vast as it has been in the course of so many ages, has nearly all found room to collect and arrange itself round the old centres. This fact does not disprove the magnitude of the increase which has been made to the numbers of the people, for the extension of the circumference, without any multiplication of the centres, would suffice to absorb any such increase, however great; but seeing how thickly covered the country actually is with towns and villages, it is certainly very curious to reflect that they were very nearly as numerous over the greater part of it in the time of the Saxons. And if only about twenty-eight of our cities and towns, or even twice that number, can be traced to a Roman original, the number indebted to the Saxons for their first foundation must be very great; for, as we have seen, nearly all that are not Roman are Saxon. . . . As for our villages, the undoubted fact that the present division of the country into parishes is, almost without any alteration, as old at least as the tenth century, would alone prove that the English villages in the Saxon times were nearly as numerous as at the present day. . . . Let it be conceded that many of the villages were very small, consisting, perhaps, of only a dozen or two of cottages, still we apprehend the facts imply a diffusion of population and of cultivation, vastly beyond what can be supposed to have taken place in the preceding or Roman period, during which, indeed, the country was traversed in various directions by noble roads, and ornamented with some considerable towns, but does not appear, from any notices that have come down to us, or any monuments or signs that remain, to have been generally covered with villages of any description.—*Pictorial History of England*, vol. i., book ii., chap. 7, 'History of the Condition of the People.'

London and Dublin Weather.—If the Dublin table be compared with that of London, several interesting results will be at once perceived. In Dublin, the average number of days of no rain is only 150, whilst in London it is 220; but at the same time the number of fair days is less in London, so that the comparison would stand thus:—

	No Rain	Fair	No Rain and Fair
Dublin	150	56	206
London	220	10	230
	70 in favour of London	46 in favour of Dublin	24 in favour of London

And in like manner—

	Light Showers	Rains	Heavy Rains
Dublin	41	94	21
London	33	82	21
	8	12	0

The actual difference of the climate, as to the number of rain days estimated on six years, is therefore 24 in favour of London, the greater proportion of which falls into the class of partly wet and partly fair, the number of days of very heavy rain being nearly the same. The range of variation in the number of days of no rain was nearly equal in both countries, but combining no rain and fair, there was less variation in the climate of Dublin than in that of London.

	No Rain Dublin	No Rain London	No Rain and Fair Dublin	No Rain and Fair London
1837	177	212	216	217
1841	120	161	197	[illegible]
	57	51	19	[illegible]

The number of days of heavy rain varies from 18 to 32 in Dublin, from 16 to 30 in London; but it is remarkable that the years do not in this respect correspond; 1841 being the year of least heavy rain in Dublin and 1839 that of the most; 1837 the year of least, 1841 of most, in London; and this difference, consequent on the different local position of the places, is also observable in the actual quantities of rain.—*Report on the Census of Ireland*, by *Capt. Portlock*.

Nelson at Trafalgar.—The interest which we all feel in every thing relating to Nelson will be a sufficient excuse for my inserting in this place a correction of a statement in Southey's Life of him, which, as there given, imputes a very unworthy and childish vanity to him, of which on that particular occasion he was wholly innocent. It is said that Nelson wore on the day of the action of Trafalgar, "his admiral's frock coat, bearing on the left breast four stars," that his officers wished to speak to him on the subject, but were afraid to do so, knowing that it was useless, he having said on a former occasion, when requested to change his dress or to cover his stars, "In honour I gained them, and in honour I will die with them." The truth is, that Nelson wore on the day of Trafalgar the same coat which he had commonly worn for weeks, on which the order of the Bath was embroidered, as was then usual. Sir Thomas Hardy did notice it to him, observing that he was afraid the badge might be marked by the enemy, to which Nelson replied that "He was aware of that, but that it was too late then to shift a coat." This account rests on the authority of Sir Thomas Hardy, from whom it was heard by Captain Smyth, and by him communicated to me.—*Note in Dr. Arnold's Lectures on Modern History.*



[The Eastern extremity of the Church, with the Altar, &c.]

THE TEMPLE CHURCH.

[Concluded from page 131.]

It has been said that the Round is deficient in colour, and there can be no doubt that in comparison with the chancel, or oblong part beyond, it is so; whether that be a defect or the reverse depends on which of two principles of art we favour, for it does not seem certain what the original arrangement of this matter was. The benchers had therefore the alternatives of raising the whole of the decorations up to such a point that, the moment the spectator entered, he should be surrounded by *all* the splendour that the church had to exhibit, thereby producing an instantaneous and powerful, but not increasing effect,—or to conduct him from the sober realities of the outer world up to the gorgeous magnificence of the altar, through a succession of transitive stages: first, a doorway sculptured only; then a magnificent vestibule (the Round), where rich colours begin to appear, but still subordinate to the architecture, and finally, of the chief portion of the chancel itself revelling in the most intimate and happy union of painting and architecture, and only less rich and glorious than the last compartment of the columnar vista. The second of these methods is the one which has been adopted by the benchers, and if a *little* more colour could be added to the Round—the large spaces of blank wall rendered a little less conspicuously blank—we think that method the best one.

The period of the erection of the Temple Church was precisely that which offered the best opportunities for rich decoration. The Crusaders, however little they liked the Saracens, were much smitten with their magnificence; and every ship that returned brought no doubt fresh importations of Eastern taste, with probably materials of various kinds—as designs—to diffuse such taste in England, and possibly even Oriental artists themselves. The spectator, therefore, who has just advanced into the church, and stands bewildered with the magical scene before him—all the old tales of childhood, with its fairy palaces and gardens of enchanted fruit, such as the 'Arabian Nights' opened into his heart once and for ever, crowding upon him—need not be surprised at the Eastern character of the

arabesques, which in many a flowery maze play over all the compartments of the roof, and entwine about its groinings down to the very capitals of the pillars which support them These last, four in number on each side, are, like the pillars of the Round, clustered, exceedingly elegant and stately-looking, and of a finely-veined dark (Purbeck) marble. A series of smaller clustered columns against the wall, and resting on the stone seat which extends along the base of the latter through the entire church, supports in a similar manner the roof of each aisle The more conspicuous ornaments in the roof of the nave differ from those in the aisles in the first we see in alternate compartments the societies' emblems in small circles, the lamb on a red ground, and the horse on a blue, and in the second the two banners used by the Templars—one a flag, half white for their friends, and half black for their enemies with the dreaded war-cry "Beauseant"—the other the Maltese-like cross with these is interspersed a device used by them, copied from a seal belonging to the Temple now in the Museum, representing the Christian cross triumphing over the Saracenic crescent.

These remarks apply with equal force to the painted windows, those of the east end, over and at each side of the altar, being one blaze of gorgeous hues, and the window in the centre of the south side being equally conspicuous for the general chasteness of its design and the intense richness of their few masses of colour, which are confined to the figures of the angels playing ancient musical instruments, three in the central light, and one in each of the others As to the chief of the eastern windows, the eye at first feels lost amidst what appears at some distance only a marvellous combination of the minutest possible pieces of glass of different hues, and, delighted with the harmony evolved from the combination, is content to be lost but as we approach nearer, the whole resolves itself into a thousand beautiful designs, and at last we perceive standing out from the rest a long series of pictures illustrating all the more important acts and events in the life of Christ Immediately beneath this window is the altar where the arcade of small trefoil bended arches, and the fretted and canopied panels in the centre, the capitals of the pillars, and the elegantly sculptured heads, are all richly gilded, yet without producing any sense of gaudiness or tasteless profusion In the centre panel is a large cross, with the letters I H C, and surrounded by small golden stars on a ground of the heavenly tincture The altar-table is covered with a crimson velvet cloth, sumptuously embroidered in gold. Everywhere, indeed we meet with evidences of the untiring zeal and liberality which have directed all the recent operations The very seats could furnish employment for an hour or two in the mere examination of the oak carvings so thickly strewed over them in the shape of heads, which are as remarkable for their variety as admirable for their expression, animals, flowers fruit and foliage—The designs are chiefly if not entirely from the casts in Mr. Cottenham's collection taken by him from the original works in the chief cathedrals by means of what is technically called *squeezes*, that is, pressing with the hand a suitable plastic material—a kind of prepared clay—on the carving or sculpture to be copied, and which as it hardens becomes a mould for the cast.

On removing the organ from the central archway, it was found a difficult matter to decide upon a new and suitable position At last a happy thought occurred to some one which, after long discussion and consultation between the Benchers, aided by the advice of some of the most eminent architects led to its being placed immediately behind the central window of the north side, in a chamber erected for it; the window itself stripped of its glass, and having an additional slender marble shaft added in the place of each division wall between the three lights forming a very handsome open screen to the brilliantly painted and gilded pipes behind, with their noble Gothic canopy The organ has lately been reconstructed, in order to receive all the best modern improvements when we add that it was previously distinguished as one of the best instruments in England, our readers may judge of its quality now. It was built by the well-known Schmidt, who, when the Societies, in the reign of Charles II, determined to erect one of the best organs that could be obtained, offered himself in rivalry with Harris to undertake the work. The makers were both so good and so popular, that the Benchers, in despair of deciding satisfactorily to all parties, in that preliminary stage of the affair, made a very ingenious proposal that each should erect an organ in the Temple, and they would keep the best This was done, and with such success by both, that the Benchers, unable to determine in favour of either, were at last obliged in order to put an end to the contest which excited the whole musical world in a most extraordinary degree, to confide the final judgment to chief-justice Jefferies who chose Schmidt's organ The other was subsequently divided, and part erected at St Andrew's, Holborn, the remainder found its way to Christ Church Cathedral, Dublin The Temple choir consists of fourteen voices, six men's and eight boys' full cathedral service is performed Beneath the organ chamber is a low vestry-room, where among other memorials, is the bust of Lord Thurlow buried in the vaults of the church, and the tablet erected by the Benchers to Goldsmith, who lies in the paved court adjoining to that side of the building which was till recently the burying-ground These are to be removed to the triforium, or gallery surrounding the Rotunda, where are all the monuments formerly in the different parts of the church, chiefly of the period of Elizabeth and James Among them is that of Plowden, the eminent lawyer, who was buried here, as was also Selden On the side of the circular stairs in the wall of the northern aisle which leads to the triforium, is a small space hollowed out not large enough for a man to lie down in at full length with two slit holes as windows overlooking respectively the two different portions of the church This was the penitential cell of the Templars, and terrible have been the penances inflicted here, if we may judge from the record of one fact —'Walter le Bachelor grand preceptor of Ireland, was placed here in irons by the master, and left till he died the corpse was then taken out at daybreak, and buried between the church and the adjoining hall' Descending again into the church, and throwing one last lingering look around, we notice the painted figures over the three archways which represent respectively beginning on the left, Henry I, contemporary with the foundation of the Order, with the black and white banner Stephen with the cross, for which in his reign they exchanged the said device, Henry II, in whose reign the Round was built, as you see by the model in his hand, Richard I, with a sword allusive to his exploits as the first of English monarchs who joined personally in the Crusades, John; and lastly, Henry III, holding a model of the entire church, the chancel having been added in his reign —an interesting series of historical portraits in connection with the Knights Templars, but which like the procession where Brutus's statue was not, suggests most by its (necessary) incompleteness. All are here that the Templars would have placed here but not the less are we reminded of Edward I, and his pious visit to his mother's jewels in the Temple which, by some peculiar mental process, ended in his carrying away ten thousand pounds from the Templars' coffers;

or of Edward II., who, after long dallying between the desire to break up the Order for the sake of its possessions, and the consciousness of the monstrous wrong that desire involved, yielded to the temptations held out by the example of the King of France, and, on the 8th of January, 1308, caused the Templars throughout England suddenly to be arrested and imprisoned; and though the excessive barbarities of the French government, where actually thirty-six out of one batch of one hundred and forty prisoners perished under the torture, were not imitated here—no bonfires lighted for such wholesale destruction as the burning of fifties at a time—yet it appears torture was resorted to in England to make the unhappy Templars confess the odious, absurd, and all but impossible crimes which Philip of France, the guiding spirit of the movement throughout Europe, had determined should be fastened upon them. With the exception of a chaplain and two serving-men, the English members remained firm; and as Edward was not prepared to go the entire length of Philip, of killing them one way or another unless they did confess, a lucky discovery was made, which, to a certain extent, relieved all parties. The Templars had believed their master had the power of absolution: this it was now most carefully and dispassionately pointed out was a grievous heresy, as the master was a layman: did they wish to persevere in heresies? Oh, certainly not: the Templars were quite willing to abjure that as well as every other heresy. Great was the apparent joy of the church ministers who had the direction of the affair; one body after another publicly affirmed this declaration; and lo! the whole were reconciled to the Christian community. As to the charges on which they had been arrested and tortured, and their possessions seized, it was marvellous to see the utter forgetfulness on all sides: not so, however, as to the goodly possessions themselves. The Order was finally abolished in 1312, and the property in England directed to be transferred to the Hospitallers of St. John, to whom Edward did ultimately hand over some portion thereof, possibly about a twentieth. The site and building soon after fell into the hands of the students of law, whose successors have now, after a lapse of five centuries, shown so nobly their sense of the value of the building and the memories committed to their charge.

PROGRESSES OF QUEEN ELIZABETH.

No. IV.

OXFORD UNIVERSITY.

The Queen appears to have commenced her progress in 1566, in August or the latter end of July. On August 3rd she was at Colleyweston in Northampton, a royal house, of which Cecil's grandfather, David, had been made steward by Henry VIII. She removed from thence on the 5th to Burghley, near Stamford, the splendid seat of the secretary, and from thence by Woodstock, arrived on the 31st at Oxford.

The reception was splendid. At Wolvercot the Earl of Leicester, the Chancellor, four doctors in their scarlet habits, and eight masters, heads of houses, with numerous attendants, met her, welcomed her with a Latin oration, and conducted her towards the city; when within half a mile of it the mayor and corporation received her, delivered up the mace, which was returned, spoke an English oration, which was answered, and presented her with a "cup of silver, double gilt, worth 10*l.* and in it about 40*l.* in old gold," which were kept. "This gift," says Wood, "was the first in money that ever, as I can yet learn, was presented to a prince: for at the coming of any one to the University before this time, the custom was, that the citizens should give them five oxen, as many sheep, weals, lambs, and sugar-loaves; but this *numerus quinarius* was now altered by Sir Francis Knolleys, the city steward, and converted into money, which yet continues." Another speech was made on her entering the city in the name of the scholars, and on reaching Quartervois (Carfax) an oration was made to her by the Professor of Greek, in that language, which she answered in the same, though professing to be in so great a company "somewhat abashed." After another oration, leaving her "rich chariot," she entered the venerable Norman edifice, at once the Cathedral church of the diocese and the chapel of Christ Church College, four doctors holding a canopy over her, and placing her on the right side of the choir; where, on being seated, and having said her prayers, the dean delivered a thanksgiving for her arrival, after which "was an anthem, called *Te Deum*, sung to cornets." Thus devotionally was the day closed, she departing from thence to her lodging in the college; of which the gates and walls by which she passed were decorated with copies of verses in Latin and Greek.

On the following day, Sunday, September 1, her Majesty was indisposed in the morning, but was entertained in her chamber by a "Latin oration, with two Greek verses at the end," delivered by "a very pretty boy, named Peter Carew," with which she was much pleased. In the afternoon she attended divine service, but was not present at a Latin play called 'Marcus Geminus,' which was exhibited in the evening on a stage erected in Christ Church Hall, though on hearing it highly commended by the Spanish ambassador, Don Guzman de Sylva, she remarked, "In troth I will lose no more sport hereafter, for the good report I hear of these your good doings."

Her Majesty kept within her lodgings chiefly on Monday, being entertained with a book of all the prophets, translated out of the Hebrew, and a little book of Latin verses, containing the description of every College, Public School, and Hall, &c., presented to her by the author, Mr. Thomas Neale, the Hebrew Professor. The verses have been preserved, and are in the form of a dialogue between the Queen and the Chancellor of the University, but contain nothing worth quoting. At night she attended the representation of a play in Christ Church Hall, 'Palæmon, or Palamon Arcyte,' made by Mr. Richard Edwards. It is difficult to imagine the mode in which this subject was treated, from the description given of its effects. It was in two parts. At the commencement of the first part on this evening, a part of the stage fell: a scholar of St. Mary's Hall, the cook of Corpus Christi College, and a brewer were killed, besides five that were hurt. The Queen sent her surgeons, and commanded they should want no necessary assistance; but afterwards "the actors performed their parts so well that the Queen laughed heartily thereat, and gave the author of the play great thanks for his pains." On the night of Wednesday the 4th, "the Queen was present at the other part of the play of 'Palæmon and Arcyte,' which should have been acted the night before, but deferred because it was late when the Queen came from disputations at St. Mary's. When the play was ended, she called for Mr. Edwards, the author, and gave him very great thanks, with praises of reward for his pains: then making a pause, said to him, and her retinue standing about her, this relating to part of the play; 'By Palæmon, I warrant he dallieth not in love when he was in love indeed; by Arcyte, he was a right martial knight, having a swart countenance and a manly face; by Trecatio, God's pity, what a knave he is; by Perithous throwing St. Edward's rich cloak into the funeral fire, which a stander-by would have stayed by the arm with an oath, Go, fool, he knoweth

his part, I warrant.'* In the said play was acted a cry of hounds in the quadrant, upon the train of a fox in the hunting of Theseus, with which the young scholars, who stood in the windows, were so much taken (supposing it was real), that they cried out, 'Now, now!'—'there, there!—'he's caught, he's caught!' All which the Queen merrily beholding, said, 'Oh excellent! those boys, in very troth, are ready to leap out of the windows, to follow the hounds.' This part it seems being repeated before certain courtiers, in the lodgings of Mr. Robert Marbeck, one of the canons of Christ Church, by the players in their gowns (for they were all scholars that acted) before the Queen came to Oxford, was by them so well liked, that they said it far surpassed 'Damon and Pythias,' than which, they thought, nothing could be better. Likewise some said, that if the author did any more before his death, he would run mad; but this comedy was the last he made; for he died within a few months after. In the acting of the said play, there was a good part performed by the Lady Amelia, who, for gathering her flowers prettily in a garden then represented, and singing sweetly in the time of march, received eight angels for a gracious reward by her Majesty's command."

The 'Damon and Pythias,' which this play is so stated to exceed, yet remains to us, and may perhaps give us some notion of 'Palemon and Arcite.' While the groundwork of the fable is taken from the classical story, all the supplementary parts are English, and of the coarsest humour. We give a short specimen of this play, as it was also acted before the Queen, and shows the nature of the entertainments that gave so much delight. Will and Jack are the servants of two of the courtiers of Dionysius, who, meeting with Grim, the court collier, who supplies, as he says, the "king's mouth" with coals, they relate to him how the king suffers no barber to come near him, but makes his daughters perform that office. The collier, who is somewhat drunk, expresses a strong wish that they would operate on him:

"I would give one sack of coals to be washed at their hands;
If ich came so near them, for my wit chould* not give three chips,
If ich could not steal one swap from their lips."

On this hint the two rascally servants act, promising to dress him in the fashion the king's daughters dress their father, intending by this means to rob him he consents, and one fetches a barber's basin, razor, a pair of spectacles, &c.

"*Jack.* Come, mine own Father Grim sit down.
Grim. Mass, to begin withall, here is a trim chair.
Jack. What, man, I will use you like a prince: sir boy, fetch me my gear.
Will. Here, sir.
Jack. Hold up, Father Grim.
Grim. Me seem my head doth swim.
Jack. My costly perfumes make that.—Away with this; sir boy, be quick:
Aloyse, aloyse†, how pretty it is! is not here a good face?
A fine owl's eyes, a mouth like an oven.
Father, you have good butter-teeth, full seen (sooth).
You were weaned, else you would have been a great calf.
Ah, trim lips to sweep a manger! here is a chin
As soft as the hoof of a horse.
Grim. Doth the king's daughters rub so hard
Jack. Hold your head straight, man, else all will be marred.
By'r Lady, you are of good complexion,
A right Croydon sanguine, beshrew me.
Hold up, Father Grim.—Will, can you bestir ye?
Grim. Methinks after a marvellous fashion ye do besmeare me.
Jack. It is with unguentum of Daucus Maucus, that is very costly.
I give not this washing ball to every body:
After you have been drest so finely at my hand,
You may kiss any lady's lips within this land.
Ah, you are trimly wash'd! how say you, is not this trim water?
Grim. It may be wholesome, but it is vengeance sour.
Jack. It scours the better.—Sir boy, give me my razor.
Will. Here, at hand, sir.
Grim. God's aims! 'tis a chopping-knife, 'tis no razor.
Jack. It is a razor, and that a very good one.
It came lately from Palermo; it cost me twenty crowns alone
Your eyes dazzle after your washing, these spectacles put on.
Now view this razor; tell me, is it not a good one?
Grim. They be gay barnacles, yet I see never the better.
Jack. Indeed they be a young sight, and that is the matter.
But I warrant you this razor is very easy.
Grim. Go too, then, since you begun, do as please ye.
Jack. Hold up, Father Grim.
Grim. Oh! your razor doth hurt my lip.
Jack. No, it scrapeth off a pimple, to ease you of the pip.
I have done now: how say you? are you not well?
Grim. Cham lighter than ich was, the truth to tell.'

The knaves have now robbed him. This is a very favourable example of the fun at which our forefathers laughed, and the whole play illustrates the principle on which much of the early English drama was constructed. The main incident is taken from Grecian story, the scene is laid in Syracuse, but the author's intention is evidently not to illustrate or exhibit Grecian manners or customs, but human passion and character in general; therefore Edwards, though a classical scholar, has no more hesitation in making his classical personages discourse as though they were contemporary with the period—Aristippus, for instance, alludes to the 'Three Cranes in the Vintry'—than he has in making them speak English, or in giving English names to their associates. Edwards had a high character at the time, not only as a poet, but as a musical composer. We believe none of his musical compositions are extant, but the following song, sung by Pythias in the same play, may give a notion of his ideas of melody, and serve as an example of the lyrical poetry of the time:—

"Awake, ye woeful wights,
That long have wept in woe:
Resign to me your plaints and tears,
My hapless hap to show.
My woe no tongue can tell,
Nor pen can well descrie [describe].
O what a death is this to hear!
Damon my friend must die.

The loss of worldly wealth
Man's wisdom may restore,
And physic hath provided too
A salve for every sore:
But my true friend once lost,
No art can well supply:
Then what a death is this to hear!
Damon my friend must die.

My mouth refuse the food
That should my limbs sustain:
Let sorrow sink into my breast,
And ransack every vein.
You furies, all at once
On me your torments try:
Why should I live, since that I hear
Damon my friend must die?

Gripe me, you greedy griefs,
And present pangs of death;
You sisters three, with cruel hands,
With speed, come stop my breath:
Shrine me in clay alive,
Some good man stop mine eye:
O death, come now, seeing I hear
Damon my friend must die."

[To be continued.]

* This is an imitation of the Somersetshire dialect. *Ich* is 'I,' and it incorporated into many other words—as *chould*, 'I would;' *cham*, 'I am.' Shakspere uses the same dialect in 'Lear.'

† Aloyse, 'praise.'



[Taddeo Gaddi (1) and Andrea Orcagna (2), with a view of the Campo Santo.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. VII.

GIOTTO AND HIS SCHOLARS—THE CAMPO SANTO.

[Continued from p. 13[illegible].]

The scholars and imitators of Giotto, who adopted the new method (*il nuovo metodo*), as it was then called, and who collectively are distinguished as the '*Scuola Giottesca*,' may be divided into two classes:—1. Those who were merely his assistants and imitators, who confined themselves to the reproduction of the models left by their master. 2. Those who, gifted with original genius, followed his example rather than his instructions, pursued the path he had opened to them, introduced better methods of study, more correct design, and carried on in various departments the advance of art into the succeeding century.

Of the first it is not necessary to speak. Among the men of great and original genius who immediately succeeded Giotto, [illegible] must be especially mentioned for the importance of the works they have left, and for the influence they exercised on those who came after them. These were Andrea Orcagna, Simon Memmi, and Taddeo Gaddi.

The first of these, Andrea Cioni, commonly called Andrea Orcagna, did not study under Giotto, but owed much indirectly to that vivifying influence which he breathed through art. Andrea was the son of a goldsmith at Florence. The goldsmiths of the fourteenth and fifteenth centuries were in general excellent designers, and not unfrequently became painters, as in the instances of Francia, Verrocchio, Andrea del Sarto, &c. Andrea apparently learned design under the tuition of his father. Rosini places his birth previous to the year 1310; in the year 1332 he had

already acquired so much celebrity, that he was called upon to continue the decoration of the Campo Santo at Pisa.

This seems the proper place to give a more detailed account of one of the most extraordinary and interesting monuments of the middle ages. The Campo Santo of Pisa, like the cathedral at Assisi, was an arena in which the best artists of the time were summoned to try their powers; but the influence of the frescoes in the Campo Santo on the progress and development of art was yet more direct and important than that of the paintings in the church of Assisi.

The Campo Santo, or the "Holy Field," once a cemetery, though no longer used as such, is an open space of about four hundred feet in length and one hundred and eighteen feet in breadth, enclosed with high walls, and an arcade, something like the cloisters of a monastery or cathedral, running all round it. On the east side is a large chapel, and on the north two smaller chapels, where prayers and masses are celebrated for the repose of the dead. The open space was filled with earth brought from the Holy Land by the merchant-ships of Pisa, which traded to the Levant in the days of its commercial splendour. This open space, once sown with graves, is now covered with green turf. At the four corners are four tall cypress-trees, their dark, monumental, spiral forms contrasting with a little lowly cross in the centre, round which ivy or some other creeping plant has wound a luxuriant bower. The beautiful Gothic arcade was designed and built about 1283 by Giovanni Pisano, the son of the great Nicola Pisano already mentioned. This arcade, on the side next the burial-ground, is pierced by sixty-two windows of elegant tracery divided from each other by slender pilasters; upwards of six hundred sepulchral monuments of the nobles and citizens of Pisa are ranged along the marble pavements, and mingled with them are some antique remains of great beauty, which the Pisans in former times brought from the Greek Isles. Here also is seen the famous sarcophagus which first inspired the genius of Nicola Pisano, and in which had been deposited the body of Beatrix, mother of the famous countess Matilda.* The walls opposite to the windows were painted in the fourteenth and fifteenth centuries with scriptural subjects. Most of these are half ruined by time, neglect, and damp; some only present fragments; here an arm—there a head; and the best preserved are faded, discoloured, ghastly in appearance, and solemn in subject. The whole aspect of this singular place, particularly to those who wander through its long arcades at the close of day, when the figures on the pictured walls look dim and spectral through the gloom, and the cypresses assume a blacker hue, and all the associations connected with its sacred purpose and its history rise upon the fancy, has in its silence and solitude, and religious destination, something inexpressibly strange, dreamy, solemn, almost awful. Seen in the broad glare of noonday, the place and the pictures lose something of their power over the fancy, and that which last night haunted us as a vision, to-day we examine, study, criticise.

The building of the Campo Santo was scarcely finished when the best painters of the time were summoned to paint the walls all round the interior with appropriate subjects. This was a work of many years: it was indeed continued at intervals through two centuries; and thus we have a series of illustrations of the progress of art during its first development, of the religious influences of the age, and even of the habits and manners of the people, which are faithfully exhibited in some of these most extraordinary compositions.

Those first executed, in the large chapel and on the walls of the cloisters, at the end of the thirteenth and in the very beginning of the fourteenth century, have perished wholly: the earliest in date which still exist represent the Passion of our Saviour in a rude but solemn style. We find here the accompaniments usual in this subject from the earliest time, and which, from their perpetual repetition down to a late period, appear to be traditional; the lamenting angels, the sorrowing women, the Virgin fainting at the foot of the cross. Two angels at the head of the repentant thief prepare to carry his soul into Paradise; two demons perched on the cross of the reprobate thief are ready to seize his spirit the moment it is released, and bear it to the regions below. This fresco and another have been traditionally attributed to the Buffalmacco of facetious memory, already mentioned; but this is now supposed to be an error.

A series of subjects from the Book of Job was painted by Giotto; of these only fragments remain. Then followed Andrea Orcagna: and the subjects selected by him were such as harmonized peculiarly with the destination of these sacred precincts: they were to represent in four great compartments what the Italians call '*I quattro novissimi*,' *i.e.* the four last or latest things—Death, Judgment, Hell or Purgatory, and Paradise; but only three were completed.

The first is styled the Triumph of Death (*Il Trionfo della Morte*). It is full of poetry, and abounding in ideas then new in pictorial art. On the right is a festive company of ladies and cavaliers, who by their falcons and dogs appear to be returned from the chase. They are seated under orange-trees, and splendidly attired; rich carpets are spread at their feet. A troubadour and singing-girl amuse them with flattering songs; Cupids flutter around them and wave their torches. All the pleasures of sense and joys of earth are here united. On the left Death approaches with rapid flight—a fearful-looking woman with wild streaming hair, claws instead of nails, large bats' wings, and indestructible wire-woven drapery. She swings a scythe in her hand, and is on the point of mowing down the joys of the company. (This female impersonation of Death is supposed to be borrowed from Petrarch, whose 'Trionfo della Morte' was written about this time.) A host of corpses closely pressed together lie at her feet; by their insignia they are almost all to be recognised as the former rulers of the world, kings, queens, cardinals, bishops, princes, warriors, &c. Their souls rise out of them in the form of new-born infants; angels and demons are ready to receive them: the souls of the pious fold their hands in prayer; those of the condemned shrink back in horror. The angels are peculiarly yet happily conceived, with bird-like forms and variegated plumage; the devils have the semblance of beasts of prey or of disgusting reptiles. They fight with each other: on the right the angels ascend to heaven with those they have saved; while the demons drag their prey to a fiery mountain, visible on the left, and hurl the souls down into the flames. Next to these corpses is a crowd of beggars and cripples, who with outstretched arms call upon Death to end their sorrows; but she heeds not their prayer, and has already passed them in her flight. A rock separates this scene from another, in which is represented a second hunting-party descending the mountain by a hollow path: here again are richly-attired princes and dames on horses splendidly caparisoned, and a train of hunters with falcons and dogs. The path has led them to three open sepulchres in the left corner of the picture; in them lie the bodies of three princes, in different stages of decay. Close by, in extreme old age and supported on crutches, stands a monk, St. Macarius, who, turning to the princes,

* See Essay II., No. 698.

points down to this bitter 'Memento mori.' They look on apparently with indifference, and one of them holds his nose, as if incommoded by the horrible stench. One queenly lady alone, deeply moved, rests her head on her hand, her countenance full of a pensive sorrow. On the mountain heights are several hermits, who, in contrast to the followers of the joys of the world, have attained in a life of contemplation and abstinence to a state of tranquil blessedness. One of them milks a doe, squirrels are sporting round him; another sits and reads, and a third looks down into the valley, where the remains of the mighty are mouldering away. There is a tradition that among the personages in these pictures are many portraits of the artist's contemporaries.

[To be continued.]

PROGRESSES OF QUEEN ELIZABETH.
No. V.

OXFORD UNIVERSITY.

[Concluded from p. 144.]

On the 3rd of September the Queen went on foot with all her retinue to St. Mary's Church to hear disputations in natural and moral philosophy, which lasted from four o'clock till six, with which she was much pleased, exclaiming, "Excellent, O excellent!" On the following morning there were more disputations in the hall of Merton College, which she also attended: she then dined at Christ Church, and again attended disputations in St. Mary's Hall in the civil law, for "about four hours," previous to her witnessing the play already spoken of. She must have been an admirable listener.

The 5th, Thursday, was again occupied by disputations in St. Mary's Church, when several of the exhibitors were omitted "for want of time," and at six o'clock the Queen concluded the act, "to the very great delight and rejoicing of many hundred then present," with a speech in Latin. She then supped, and repaired to Christ Church Hall to witness the performance of the Latin tragedy of 'Progne,' by Dr. James Calfhill, for which she gave him thanks, "but it did not take half so well as the much-admired play of 'Palæmon and Arcyte.'" On the following day the degree of Master of Arts was conferred on many of the noblemen and gentlemen of her retinue, which was followed by a Latin sermon in the Cathedral, at which the Queen was not present, "being much wearied." The Vice-chancellor and proctors afterwards presented her, in the name of the University, with "six pairs of very fine gloves; and to divers noblemen and officers of the Queen's family some two, some one pair, very thankfully accepted." After another oration she departed with her retinue by Carfax to East Gate, attended by the officials of the University and city, the scholars and others standing in order, while the walls were "hung with innumerable sheets of verses, bemoaning the Queen's departure, as did the countenances of the laity (especially those of female sex) that then beheld her." On reaching the boundary of the University jurisdiction at Shotover, an "eloquent oration" was delivered, to which she answered, turning her face towards Oxford, "Farewell, the worthy University of Oxford; farewell, my good subjects there; farewell my dear scholars, and pray God prosper your studies; farewell—farewell."

Notwithstanding her apparent affability and expressed satisfaction, there were many things in Oxford that displeased; and among the earliest of her acts on her return to London were the issuing of orders for the defacing and melting down of "plate remaining in superstitious fashion," and the transmission to Lambeth of certain "superstitious books," among which are enumerated mass-books, invitatories, psalters, a "great prick-song book of parchment," and others on vellum and on paper. She stopped on her return at Rycott, and in the course of the year visited Dr. Heath, the deprived Archbishop of York, at Cobham.

In 1592, Lord Buckhurst being Chancellor, Queen Elizabeth visited Oxford a second time, on Friday the 22nd of September, remaining till the 28th, when the reception and entertainments were so entirely of the same character as to render a repetition needless. But the Queen does not appear to have been so patient an auditor on this occasion as on the previous one. During the oration of the Bishop of Hereford, in one of the disputations, "Whether it be lawful to dissemble in the cause of religion?" "the Queen, being somewhat weary of it, sent twice to him to cut it short, because herself intended to make a public speech that evening; but he would not, or, as some told her, could not put himself out of a set methodical speech for fear he should have marred all, or else confounded his memory. Wherefore, seeing it was so, she forbeared her speech at that time, and more privately the next morning sending for the heads of houses and other persons, spake to them her mind in the Latin tongue. And among others there present, she schooled Dr. John Reynolds for his obstinate preciseness, willing him to follow her laws, and not run before them." While in the midst of her speech, she noticed the old Lord Treasurer Burleigh, who was lame, standing, when she stopped, and would not proceed till a stool was procured for him, and then "fell to it again as if there had been no interruption." This, it was said, was done as a satire on the bishop, "who durst not adventure to do a less matter the day before:" of another of the speakers she remarked—"He had been already too long;" and several were cut short by the Proctors. On Sunday evening she attended the representation in Christ Church Hall of a comedy called 'Bellum Grammaticale;' and on Tuesday of another called 'Rivales:' of the nature of which we are told nothing, except that her Majesty heard them "most graciously and with great patience." A representation of the interior of Christ Church Hall has already been given in No. 182, together with several of the other buildings and objects of interest in Oxford in that number and No. 165. She was again accompanied on her departure to Shotover, and again "looking wistfully toward Oxford, said to this effect in the Latin tongue: 'Farewell, farewell, dear Oxford, God bless thee, and increase thy sons in number, holiness, and virtue,'" &c. —a somewhat equivocal prayer perhaps.

In 1567 and the few following years we have little or nothing beyond the mention of the places she visited. On August 18, 1567, she was at Oatlands; on the 21st at Guildford; on the 25th at Farnham; and on September 9th she arrived at Windsor, from whence she had started. On July 4th, 1568, she was at Greenwich; on July 6th, at Howard Place, London; on the 14th and 15th at Havering; on the 19th at Copt-Hall near Waltham; and also visited Anthony Cooke at Giddy or Gidea Hall, near Romford. On July 25, she was at Enfield; on the 28th at Hatfield. During August she visited St. Alban's, Whaddon, Bucks; Easton, Neston, and Grafton, Northamptonshire; Bicester and Rycot, Oxfordshire; and Newbury and Reading in Berkshire; but we have no record of any of the proceedings. In 1569 she was at Richmond on July 27, and at Oatlands on August 2nd; at Guildford and Farnham on August 3rd, and again at Guildford on August 12th; and in this and the following month visited in succession, Titchfield House, the seat of the Earl of Southampton; the Vine, the residence of Lord Sandys; and Basing-House, the mansion of the Marquis of Winchester,

and where we shall meet her again in 1601, when visiting his successor. In September she was at the town of Southampton, from whence she issued an order to the citizens of Coventry, displacing their mayor, John Harford, for beating a man who had meddled with his greyhounds, with a walking-staff, so that he died: he was also forced to agree with the man's wife for his pardon, and exempted from the council for ever. The Queen then spent her Christmas at Hampton Court, on account of the plague, which was then "dispersed far abroad in London."

In the accounts of the Queen's purse, made up to the end of this year (1569) from 1559, we find some curious entries. Her practice in music is shown by the entry of 74*l.* 13*s.* 4*d.* for lute-strings for various years at the rate of 13*l.* 6*s.* 8*d.* per annum; one great sackbutt, 15*l.*; 68*l.* 7*s.* 11*d.* for perfumes; painting-work 6*l.* 13*s.* 4*d.*; 1804*l.* 19*s.* 10½*d.* for articles connected with the wardrobe; while the only entry of a literary character is 1*l.* 0*s.* 8*d.*, for binding four books.



[The Ameers of Scinde.]

SCINDE AND THE SCINDIANS

There are many fairer portions of the earth than Scinde; but if its rulers had allowed the resources of the country to be freely developed, the Scindians might have been a happy and prosperous people. The Arabian Gulf, which on the east washes the coast of Malabar, and on the west the coast of Arabia, is the southern limit of Scinde; and Curachee, the most western Scindian port, is just at the mouth of the Gulf of Persia. Scinde is bounded on the south by the sea, as already stated; on the west by Beloochistan; on the north by Affghanistan and the Punjaub; and on the east it is separated from Hindostan by a sterile and unproductive tract of country. The exact limits over which the power of the Ameers extended were not always very accurately defined, as the weakness of a neighbour led them to make encroachments upon his territory. Recently the country ruled over by the Ameers comprised about a hundred thousand square miles (nearly twice the extent of England), and the number of the inhabitants was about a million. Scinde was formerly a tributary of the Affghan monarchy, but about sixty years since, when the Douranee dynasty was in a tottering state, a Beloochee chief of the Talpoor tribe set up as a ruler on his own account, but he took the remarkable course of admitting his three younger brothers to a share of the power and cares of state, and they agreed to reign together under the title of the Ameers or Lords of Scinde. These four chiefs were long known in the East by the appellation of the 'Char Yar,' or the four friends. One of the brothers died in 1801, when the three remaining brothers partitioned the country amongst them, and were nearly independent of each other. Their relative position is shown by the different amount of their respective revenues, for while one had an annual income of fifteen lacs of rupees (100,000*l.*), that of the two others did not exceed ten

lacs in one case and five in the other. The most powerful of the Ameers resided at Hyderabad, the modern capital, where, in a massive tower within the fort, a treasure was amassed, valued at twenty millions sterling, thirteen of which were in specie and the remainder in jewels. The revenue of the three Ameers was nearly the total revenue of Scinde. There were a few chiefs who possessed portions of the country, and levied duties on their own account. There were nobles of the Talpoor tribe always resident at the court of the Ameers, all of whom enjoyed the title of Ameer, but were not allowed any share in the affairs of the state.

When Mr. Burnes visited Hyderabad in 1827, only two of the Ameers were living. So jealous had they been of the British government, that they had allowed no European officer to cross their frontier from the British province of Cutch on the south-east; and during the Burmese war it became necessary to overawe them by a display of force. Much surprise therefore was excited when, laying aside their cold and unfriendly attitude, they addressed a very friendly letter to the Resident in Cutch, requesting Mr. Burnes to proceed to Hyderabad on account of the illness of one of the Ameers. Mr. Burnes was pleased with the good taste exhibited in his reception at their court. "There was no gaudy show of tinsel or scarlet: none of that mixture of gorgeousness and dirt to be seen at the courts of most Hindoo princes." But in matters more important than these their conduct is deserving only of condemnation, though the defects of education may account partly for the narrow policy which they pursued. Mr. Crow, in his account of the four Ameers, written at the end of the last century, says, "The present rulers of Scinde have been seen, it is said, tending cattle in its jungles, and cooking their own meals. Certain it is that their understandings, dispositions, and manners betray great barbarity of education, and that since their affluence they have derived little cultivation from literature or society." Though professing great attachment to the Mohammedan religion, they could not boast of a respectable mosque in their dominions; and, in spite of their wealth, they were, according to Mr. Elphinstone, ignorant of elegance or comfort.

The government of the Ameers was a harsh military despotism, careless of the welfare of the people, regarding the extent of their treasure as the surest foundation of power. The light in which the unproductive mass of precious metals and stones at Hyderabad was regarded, is a proof in itself of a barbarous and unenlightened mind. The taxes were enormous, and were farmed to the highest bidders, chiefly Hindoos, who alone possess capital. Trade and industry were paralysed by absurd restrictions and heavy duties. Mr. Burnes says that it is "difficult to conceive a more unpopular rule with all classes of their subjects than that of the Ameers." The passion for hunting is indulged in to a most extraordinary extent by the Ameers and other chiefs. They depopulated extensive and productive tracts of country in order to make forests and covers for game. It is no wonder, therefore, that the people were in a wretched state, both in the towns and villages. Hyderabad, the capital, situated on the banks of the Indus, one hundred and thirty miles from the sea, was little better than a collection of mud hovels, and not much more substantial than those found in the villages. Numbers of the people lived in grass huts erected amidst their cultivated land; and when food or forage failed it was not unusual for a whole village to be abandoned for a more favourable station. The Scindians are described by the late Sir Alexander Burnes, in his 'Memoir of the Indus,' as passionate and proud, feelings which he ascribes to their savage ignorance and jealousy, and they are naturally insincere, from living under a tyrannical government; but they are, he says, honest, and, under peculiarly tempting circumstances, his property was always respected. They are brave soldiers, and do not display that passion for cavalry which distinguishes other Asiatic people, but pride themselves on their qualities as foot-soldiers. Sir Alexander Burnes remarks, that their whole armed force, if brought into the field, would be little better than an undisciplined rabble. In 1834 the last of the four Ameers died, and, as a natural consequence of the state of the succession, the conflicting factions of the young princes brought on a civil war. The country has since been more or less in a disturbed state, and at present the leading Ameer is embroiled with the British government in India on points connected with the navigation of the Indus. It is scarcely possible that the result of the contest should be otherwise than advantageous to the people of Scinde, and if once the Ameers learn to know the real objects of government, the Scindians may become a happier people, and Scinde a wealthy and commercial kingdom. Scinde has fallen into a worse state since it was described by Mr. Burnes fifteen years ago, in consequence of the anarchy which ensued on the death of the last of the four Ameers. Their treasure and their field-sports are still the chief objects of those who have succeeded them. Mrs. Postans, whose work on 'Western India' is well known, in an account of a steam-trip down the Indus in 1842,* speaking of the fine forests of the Ameers enclosed with walls for the preservation of game, says that every head of game was calculated to cost the Ameers 50*l*., reckoning only the expenses of their sporting establishments. In the period which had elapsed since Mr. Burnes's visit, the lords of Scinde appear neither to have forgotten anything nor to have learnt anything.

The Indus, which is navigable from Lahore to the sea, a distance of a thousand miles, hitherto almost a stranger to commercial enterprise, is now enlivened by steam-boats. This river does not possess the advantages of the Ganges, and large ships cannot enter any of its numerous mouths, but flat-bottomed boats and steam-boats constructed for the purpose may navigate its waters in safety. The British government has already formed treaties with the several states on the banks of the river, with a view of promoting and protecting trade. Steam-boats established by the government and by private traders have already opened a commercial intercourse by this route with the north-western provinces of Hindostan. It is the intention of the government so to improve the roads between the Sutlej and the Jumna and the Ganges, as to enable the British merchant who enters the Sutlej from the Indus to convey his goods from the former river, and to *descend* the Jumna and Ganges, instead of ascending them against the stream. The benefits of this commercial activity will soon be felt in Scinde, which derives, like Egypt from its Nile, a fertility of soil which is periodically renewed by the overflowings of the Indus, and the benefits of which might be greatly extended by canals of irrigation. At present districts adapted for cultivation are in pasture, but near the river the famines which arise from droughts are unknown. Vegetation is exuberant, and the abundance of food attracts people from the neighbouring states which enjoy a less happy position; and yet lands, which might supply the whole of Western India with their surplus produce, are overrun with jungle, and devoted to beasts of the chase.

* 'Asiatic Journal' No. 155.

THE HORSE-FARMS OR HERDS OF SOUTHERN RUSSIA.

The Russian cavalry, and a large proportion of all the horses required in the eastern countries of Europe, are mainly supplied from vast herds of horses which wander, in a semi-wild state, over the "steppes" or plains in the southern part of Asiatic Russia. These plains are of a most extraordinary character. They extend entirely across the empire, from the confines of Hungary to those of China. Throughout this distance of several thousand miles, scarcely a hill, or even a tree, is to be seen: the whole is one monotonous level, presenting less diversity of appearance, perhaps, than any other portion of the earth's surface. A traveller may proceed in a straight line for hundreds of miles without encountering a tree, or even a bush. The situation is so exposed that there is shelter neither from the heat of summer nor the cold of winter. During a few favoured months, such as April, May, September, and October, the ground is covered with coarse grass; but during five winter months the cold is so intense that even the arctic regions can scarcely exceed it in rigour; while during two or three summer months the parching dryness is such as Africa only can excel. In such a climate, where agriculture could be pursued only under great disadvantages, and where cities and towns can hardly be said to exist, the principal occupation of the inhabitants is to rear horses, oxen, and sheep, all of which largely supply the European markets.

The rearing of horses is the most remarkable of these three occupations, in respect to the differences which characterise Asia from Europe. A herd of horses, only a little removed from a state of wildness, is possessed generally by a Russian noble, who intrusts the entire care of it to a herdsman, called a *tabuntshik*, the herd itself being called a *taboon*, or *tabun*. The great Russian families of Woronzoff, Orloff, Potocki, Rasumoffsky, &c., all possess vast tracts of land in the "steppes;" and the rearing of herds of horses on these steppes forms a notable part of the revenue of the proprietors, since horses can range over a large expanse of ground, and obtain support from land too poor to afford pasturage to cattle or sheep.

When a *taboon* is about to be formed, a few stallions and mares are placed on the estate, under the care of a tabuntshik; and these are kept together year after year till the number of horses amounts to nearly a thousand, beyond which number it is not usual to increase the size of a taboon, other taboons being in such case detached from . It is not till a taboon is full that the proprietor begins to become a seller, by selling them at large horse-fairs held in different parts of the steppes, or to the government contractors, who go round from one taboon to another to select horses for the cavalry and the government service generally.

The terms on which the tabuntshik is engaged by the owner, as well as the nature of the country and climate, conspire to render the life of one of these herdsmen, or horseherds, if we may coin such a term, most wild and precarious. He is answerable for every horse that may be lost or stolen; and, as both wolves and horse-thieves are plentiful in the steppes, his wages are generally wofully lessened by the value which he has to remit for the lost or stolen horses. The thousand horses, so far from being docile and well secured, are half wild, and have abundant opportunities for escaping from the herd; and the keeper has therefore to guard against the wildness of the horses themselves as much as against wolves and thieves. He almost lives in his saddle, by night as well as by day; and indeed more by night than by day, for the horses are most apt to stray, as well as to be attacked by wolves or seized by thieves, in the night-time. He must have a constitution capable of enduring the greatest privations and the extremes of weather; for whether in the fierce cold of winter or the equally fierce heat of summer, he must be alike watchful over his herd. A roof in winter and a shady spot in summer are alike uncertain to him; and he must hold himself in readiness to gallop off at a minute's notice after a stray horse.

The dress of these men is a *multum in parvo*, an assemblage within a small space of as many conveniences as circumstances will allow them to provide. The principal garments are composed of leather, which are bound around his middle by a leather girdle. The head-covering is a high, cylindrical Tartar cap, made of black lambskin; and the outer garment is a large brown woollen cloak, called a *sveeta*, with a hood to cover the head. This hood is allowed to hang behind in fine weather, and then often serves both as pocket and larder. Among the implements carried by the tabuntshik are a whip, a sling, and a wolf-club. The whip, called the *harabuck*, has a short, thick handle, and a thong fifteen or eighteen feet in length: this he has almost constantly in his hand, it being the chief instrument by which he keeps his disorderly herd in order. The sling is something like the *lasso* of the South American hunters, and is used to catch the horses when roaming about the plains; the keeper being able, by an unerring aim, to throw the lasso round the horse's neck without hurting him. The wolf-club, as its name imports, is used to repel all of the enemies against whom the tabuntshik has to contend: it is a thick club, three or four feet long, armed with a thick iron knob at one end, and kept always ready near the pommel of the saddle. When hurled at a wolf with the dexterity which these men have learned to use, it seldom fails to give a fatal blow to the animal.

As for provisions, the keeper is but slenderly provided. He carries a cask of water, for the steppes are but scantily supplied with that invaluable commodity. He also carries a bag of bread, and a bottle of brandy, and sundry trifles which fill up the measure of his removable baggage.

The kind of life which is led by the horses intrusted to the care of these men may now be briefly sketched. From about April to October, when the steppes are coated with grass, the horses are constantly grazing, and make amends for the privations of the past winter. During the other half of the year they remain under shelter at night, and roam about during the day to gather what little herbage they can find beneath the snow. An eye-witness has observed:—"When we say the horses remain under shelter, it must not be supposed that the shelter in question resembles in any way an English stable. The shelter alluded to consists of a space of ground enclosed by an earthen mound, with now and then something like a roof towards the north, to keep off the cold wind. There the poor creatures must defend themselves as well as they can against the merciless Boreas, who comes to them unchecked in his course all the way from the pole. To a stranger it is quite harrowing to see the noble animals, in severe weather, in one of these unprotected enclosures. The stallions and the stronger beasts take possession of the shed; the timid and feeble stand in groups about the wall, and creep closely together, in order mutually to impart a little warmth to each other." And not only do the horses suffer thus from cold; but, through the improvidence of the Russian agriculturists, although there is abundant grass for hay grown in the summer, yet very little care is taken to lay by a store of fodder for the horses in winter; and thus it often happens that the poor animals are so reduced as to eat away

each other's manes and tails, for lack of anything else in the form of food.

When winter is over, the horses appear as a troop of sickly skeletons, worn down almost to death by cold and hunger: but they speedily recover when luxuriating in the grass, which appears about April or May; and for a couple of months they are full of life and glee. The heats of summer are, however, nearly as bad for them as the cold of winter; not in relation strictly to the heat itself, but to the dreadful drought which accompanies it. The steppes are said to become so thoroughly dried and even baked in July and August, that scarcely a vestige of herbage remains, and all the streams are more or less dried up. The horses can find scarcely anything either to eat or to drink, and they endeavour to shield themselves from the fierce heat of the sun by grouping or huddling themselves together, each one under the partial shadow of another.

A pleasant autumn succeeds a scorching summer, and the horses, provided with abundance of grass and of water, and exposed to a mild temperature, recover from the debilitating effects of the summer, and in some degree prepare themselves for the horrors of the forthcoming winter.

There are often fierce and remarkable contests between the horses and the wolves which infest the "steppes." The wolves generally approach singly towards the herd, and springing suddenly on a mare who may be at the outskirts, kill her, and then carry off her foal. But as there are few thickets or bushes for concealment, the attacks of the wolf are not so often successful as they would be in a different kind of country. Sometimes a party of wolves attack the *taboon* or herd at night, and a scene ensues which has been thus described by a writer in the 'Asiatic Journal:'—"An admirable spirit of coalition then displays itself among the horses. On the first alarm, stallions and mares come charging up to the threatened point, and attack the wolves with an impetuosity that often puts the prowlers to instant flight. Soon, however, if they feel themselves sufficiently numerous, they return, and hover about the taboon, till some poor foal straggles a few yards from the main body, when it is seized by the enemy, while the mother, springing to its rescue, is nearly certain to share its fate. Then it is that the battle begins in real earnest. The mares form a circle, within which the foals take shelter. We have seen pictures in which the horses are represented in a circle, presenting their hind hoofs to the wolves, who thus appear to have the free choice of fight or to let it alone. Such pictures are the mere result of imagination, and bear very little resemblance to reality; for the wolf has, in general, to pay much more dearly for his partiality to horse flesh. The horses, when they attack wolves, do not turn their tails towards them, but charge upon them in a solid phalanx, tearing them with their teeth, and trampling on them with their feet. The stallions do not fall into the phalanx, but gallop about with streaming tails and erected manes, and seem to act at once as generals, trumpeters, and standard-bearers. Where they see a wolf, they rush upon him with reckless fury, mouth to mouth; or, if they use their feet as weapons of offence, it is always with the front, and not with the hinder hoof, that the attack is made. With one blow the stallion often kills his enemy, or stuns him; if so, he snatches the body up with his teeth, and flings it to the mares, who trample upon it till it becomes hard to say what kind of animal the skin belonged to."

The tabuntshiks take care to keep their respective taboons or herds at a distance from one another; for if they meet, a desperate encounter generally ensues, all the horses of one herd making common cause against the strangers. The stallions are always the combatants, the mares and foals keeping aloof.

It may well be supposed that the control over five hundred or a thousand such horses as these must be a most laborious occupation, and we may well wonder that any men can be found to undertake such a task; for they are freemen, and not slaves, who act as *tabuntshiks*. The truth seems to be that they are desperate, reckless men, whose habits unfit them for a more quiet and moderate kind of life. They receive a rate of wages decidedly high compared with the Russian average: it amounts to five or six rubles per year per horse, equal to about 275*l*. a year English. But out of these wages the tabuntshik has to defray all losses arising from robbery, attacks by wolves, strayed horses, and the hire of three or four assistants. Still his net earnings are high, and these he spends mainly at the brandy-houses which are to be found scattered on the plain. Two or three years of this life of excitement incapacitates a man for any quieter employment, and ten or fifteen years of it wear him out.

These reckless men have more of what may, by abuse, be called liberty, than most other men in Russia. They are servants, yet their services are of such a peculiar kind, that a Russian noble would hesitate long before he discharged a tabuntshik from the care of a taboon: the man has become acquainted with the horses, and the horses with him; he knows the value of each, and can offer sound advice as to which may best be kept and which sold: he knows where are the best pasture-grounds; and the horses, after being accustomed to him, yield a very unwilling obedience to another. Thus the servant possesses, in the eyes of his master, a value which causes his vicious qualities to be winked at.

When a horse-fair is held in any of the towns, the horses are driven into the market in the same free condition in which they roam over the plains; for if tied together, they would become restless and ungovernable. When driven through towns and villages, the animals always seem somewhat frightened, from the entire newness of the scene; but as in such case they all keep closely together, they give the keeper less instead of more trouble. In the market-place, the owner of the horses is seated near an enclosure, into which the animals are driven by the tabuntshik. A scene of bargaining then ensues, the animals remaining in the enclosure until the bargain is completed. When the price is agreed upon and paid, and a fee given to the tabuntshik, he dexterously throws his sling round the neck of the selected horse, and thus secures him. If the purchaser refuses to fee this desperado, he is apt afterwards to find that the horse has been purposely injured by the man in the act of catching him.

When the government purveyors or contractors are in search of cavalry horses they do not wait for the fair-time, but go from one taboon to another, selecting such horses as may be fit for the service, and paying for them a price previously agreed upon with the proprietor.

Chinese Tools and Chinese Mechanics.—Though their iron-work is not good, yet their tools, such as chisels, planes, axes, &c., are excellent, and kept very sharp. They make use of the circular instead of the hand-saw. They have a saw for particularly fine work, which if we had not seen them using, we should have imagined the work had been done with a chisel; the blade of it consists merely of a single piece of brass wire jagged with a sharp instrument. The pattern to be carved is traced on the wood, and a hole is bored in it, through which the wire is passed and made fast to the handle, which is kept outside the wood: the drawing is then cut with the greatest care and accuracy. For all rough work they make use of a small sort of axe, slightly rounded on one side. This answers the purpose of an adze. In peaceful

times the streets of a Chinese city must present a very fine appearance, from the way the front sign-boards are painted and gilded. The inside of the shops are protected from the sun by screens extending across the streets, supported from the roof of the house. These are either of matting, or, in order to admit the light, are made of oyster-shells scraped fine, set in frames like panes of glass. We set a great many tailors to work for us; who made things very well if they had a good pattern; but it was necessary to be careful that there was no defect or patch in it, for they copied exactly as they saw the article before them. Our gloves puzzled them most; only one man succeeded in turning out a pair at all resembling English gloves. They were almost the only tradespeople who did not desert the city, and they had always plenty to do.—*Doings in China.*

Irish Climate and its Uses.—Of all subjects of conversation, the weather is perhaps the most engrossing, and in few countries is it so much a subject of complaint as in Ireland. Every one feels, acknowledges, and generally exaggerates the supposed evil, whilst the principal remedy of its practical ill consequences, drainage, is universally neglected. Too much water requires drainage as a corrective; the excess of water being the evil, not the water itself. These remarks I make from the conviction which has often passed over my mind when visiting some of the wilder and more unpromising parts of the country, that the dampness of the climate, under the present rude system of tillage, is a blessing rather than a curse. It induces natural fertility, where without it there would be sterility; and appears to be the reason why soils of indifferent quality are so often covered with a fresh and wholesome verdure, and tracts of mountain or rocky ground, which would appear to repel cultivation, are made to produce crops and to support a considerable population. The wanderer along the mountain side or in such rocky districts as those of Ointor, Dungate, Craigbillyhinky, Cieggancomor, &c., will have frequent cause to admire the patience and fortitude with which the humble peasant encounters the apparently impracticable task of clearing away stones, reclaiming bog, and introducing cultivation amidst the rocks, and though he may murmur at the frequent shower, to him so troublesome, he will readily recognise it as a powerful auxiliary to the poor man's labours. A dry climate would require a more perfect tillage to render the soil fitted to absorb moisture, a damp climate forces vegetation in spite of indifferent culture. But if the climate in some degree favours the rude operations of the small farmer, it ought to stimulate him to exertion, by the conviction that were the ground drained and the culture improved, the chances of a good harvest would be vastly increased, even in mountain districts, and in the lower and more fertile tracts, where the excess of water has scarcely any counterbalancing advantage, a most serious evil would be removed.—*Report on the Geology of Londonderry, by Capt. Portlock.*

Substance of Comets.—The most interesting question is that of their masses—are they solid, or mere clouds of gaseous matter? Do they derive light from the sun or are they luminous of themselves? Do they gradually waste away, or do they continue of the same magnitude and intensity of light? These are the only questions which it is worth while to state separately, being the only ones as to which good grounds for conjecture can be given. The question relative to the masses of comets has been pretty well settled. It may be stated as a certain fact, that though several comets have been placed in situations in which a mass as heavy as a satellite of Jupiter would have produced sensible effects of perturbation, no such effects have been produced. The comet of 1770, had it been only the five thousandth part of the earth, would have altered the length of our year more than a second of time, which must have been observed again and again before now. The same comet must have passed in 1779 between the satellites of Jupiter; had it been the fiftieth part of one of them in mass, it must have affected that system visibly. The comet of Biela came very near the earth in 1832, yet not the smallest effect of perturbation has been observed. But the question has been lately brought within still narrower limits. The tail of a comet supposed to consist of matter like the gases on our earth (on which supposition every speculation must proceed), is a continual efflux from the body. It is impossible that a permanent atmosphere could be in equilibrium under such a form. The attraction of the body of the comet itself upon such an atmosphere must be exceedingly slight. Again, it is known from the old planets that if space be filled with any fluid, such a fluid must be excessively rare and elastic, or it would show some effect in gradually causing the planets to approach the sun, and shortening their period of rotation. No such acceleration has been observed; not that small accelerations cannot be detected, for that of the moon, depending on other causes, has been detected, though only amounting to a minute of space in six centuries. Nevertheless, just in the same way as the fall of a feather shows our atmosphere, though that of a bit of lead does not, it may happen that a fluid pervading all space, and so rare as not to affect the planets sensibly for many thousands of years, may soon show itself on such a mass as that of a comet. According to the observations of Encke, the comet which bears his name is gradually shortening its period, at the rate of something less than one day out of twenty-five hundred, being precisely the sort of effect, and up to this time the only known sort of effect which could result from a resisting medium. . . . It is most probable that a comet is altogether gaseous, without any solid matter whatever. Stars have been repeatedly seen through the thickest parts. Sir J. Herschel, for instance, in 1832, saw a group of stars of the sixteenth magnitude almost through the centre of Biela's comet. . . . We cannot help being convinced that every probability leans towards the truth of the gaseous hypothesis. If this be true, we might as well attempt to ascertain how far a cloud which is driven against a mountain will tend to break off the top, as speculate upon any mechanical danger to the earth from contact with a comet. The effect of such a circumstance would be the mixture of its gaseous material with the atmosphere, a permanent rise probably in the mean height of the barometer (though there is no evidence to make it highly probable that all the comets put together would have mass enough to produce a sensible effect of this kind), and, if the gaseous matter should condense sufficiently to descend to the lower regions of our atmosphere, some effect upon animal and vegetable existence, as likely good as bad. For anything rendering the contrary highly probable, the earth may have been many times in the tail (or, as we might say, in the draft) of a comet. That comets receive their light from the sun is made evident by their alterations of brilliancy. If they shone by their own light, the size would vary with the distance, but not the intrinsic brilliancy. But nothing like phases have been observed, except in a very few instances, which are satisfactorily shown to be either doubtful as to the fact, or not such phases as should have been, the position of the sun and earth being considered. This absence of phase is in favour of the supposition of an irregular gaseous mass. If we take all the recorded accounts we should certainly be inclined to imagine that the whole system of comets is diminishing in brilliancy and magnitude. But these accounts were written under the bias of terror, and must be considered as most probably exaggerated. It is impossible to see how the waste which arises from the tail can go on without such diminution. The only positive fact however is this, that the comet of Halley, which in 1682 was as round and clear as Jupiter, was not visible to the naked eye in 1759, and in 1835 exhibited a medium brightness, being then in a much more favourable position. The question as to waste is therefore mixed up with others, from which it cannot at present be separated. The nuclei of comets (so far as observed) have varied from 30 to 3000 miles, the lengths of their tails from nothing up to more than a hundred millions of miles.—*Penny Cyclopædia.*

Tea-drinking on the Neva.—It is curious to see the people drink tea aboard these steamers: a passenger asks for tea for, say, which the French understand *un thé complet*, the Russians a portion, we should say, tea for one. This comprises a small teapot in which the tea, and that of the best kind, has been infused, a larger teapot full of hot water, a small saucer full of lump sugar, an empty tumbler and teaspoon, a slice of lemon, and a small decanter of spirits. All this is served simultaneously upon a tray. As soon as the tea is sufficiently infused, he pours it out into the tumbler, to which he adds a glass of spirits and a slice of lemon, and then fills up the smaller with hot water from the larger pot. The first glass of tea expedited, he brews again in the same way, and thus for five or six times, till the tea has no longer colour or flavour, but there is the lemon, the sugar, and the brandy, and the tea is now the apology. The effect produced will depend upon the quantity of brandy which he has thus sipped. If he have been sparing, he remains quiet upon deck, or converses freely with his fellow-passengers. If he have sucked the monkey too strongly, he is mischievous, and is for looking after the machinery.—*Life of a Travelling Physician.*



SIR ROGER DE COVERLEY.—No. IV.

The 113th number of the 'Spectator' describes Sir Roger de Coverley falling in love with a beautiful widow. The paper is by Steele; and to a reader of the present day it may appear somewhat trite and mawkish. The good old knight looks back upon his unrequited youthful affection with a half-ludicrous solemnity. His mistress was a learned lady, who only gave him the encouragement of declaring that "Sir Roger de Coverley was the tamest and most humane of all the brutes in the country." It is scarcely necessary to follow the disconsolate bachelor's relation of his disappointment. The following description, however, of the sheriff riding in state to the assizes will serve, with a little variation of costume, for a picture of the same scene in our own day: for who amongst our country readers has not heard the barbarous dissonance of the sheriff's trumpets, and smiled at the awkward pomp of his mighty javelin-men?

"I came to my estate in my twenty-second year, and resolved to follow the steps of the most worthy of my ancestors who have inhabited this spot of earth before me, in all the methods of hospitality and good neighbourhood, for the sake of my fame; and in country sports and recreations, for the sake of my health. In my twenty-third year I was obliged to serve as sheriff of the county; and in my servants, officers, and whole equipage indulged the pleasure of a young man (who did not think ill of his own person) in taking that public occasion of showing my figure and behaviour to advantage. You may easily imagine to yourself what appearance I made, who am pretty tall, rid well, and was very well dressed, at the head of a whole country, with music before me, a feather in my hat, and my horse well bitted. I can assure you I was not a little pleased with the kind looks and glances I had from all the balconies and windows as I rode to the hall where the assizes were held. But, when I came there, a beautiful creature in a widow's habit sat in the court to hear the event of a cause concerning her dower. This commanding creature (who was born for the destruction of all who beheld her) put on such a resignation in her countenance, and bore the whispers of all around the court with such a pretty uneasiness, I warrant you, and then recovered herself from one eye to another, until she was perfectly confused by meeting something so wistful in all she encountered, that at last, with a murrain to her, she cast her bewitching eye upon me. I no sooner met it but I bowed like a great surprised booby; and knowing her cause to be the first which came on, I cried, like a captivated calf as I was, 'Make way for the defendant's witnesses.' This sudden partiality made all the county immediately see the sheriff also was become a slave to the fine widow. During the time her cause was upon trial, she behaved herself, I warrant you, with such a deep attention to her business, took opportunities to have little billets handed to her counsel, then would be in such a pretty confusion, occasioned, you must know, by acting before so much company, that not only I, but the whole court, was prejudiced in her favour; and all that the next heir to her husband had to urge was thought so groundless and frivolous, that when it came to her counsel to reply, there was not half so much said as every one besides in the court thought he could have urged to her advantage."

TRIAL BY COMBAT.

It is pretty generally known how recently the trial by battle in criminal cases has been abrogated, namely in 1819, after the case of Ashford *versus* Thornton, when the latter, accused of murder, appealed to this right, which was allowed, but led to its immediate legislative abolition. But it is perhaps not so generally known, that, as Bishop Hurd observes, in his 'Moral and Political Dialogues,' "even questions of right and property were determined at the barriers, and brute force was allowed the most equitable, as well as shortest, way of deciding all disputes, both concerning a man's estate and honour." The last recorded instance of this nature occurred in the reign of Elizabeth, and is narrated as follows:—"The 18th of June, 1571, in Trinity term, there was a combat appointed to have been fought for a certain manor and demesne lands belonging thereunto, in the Isle of Harty, adjoining to the Isle of Sheppey, in Kent. Simon Low and John Kime were plaintiffs, and had brought a writ of right against Thomas Paramore, who offered to defend his right by battle. Whereupon the plaintiffs aforesaid accepted to answer his challenge, offering likewise to defend their right to the said manor and lands, and to prove by battle that Paramore had no right or good title to have the said manor and lands. Hereupon the said Thomas Paramore brought before the judges of the Common Pleas at Westminster one George Thorne, a big, broad, stout, strong-set fellow; and the plaintiffs Henry Nailer, master of defence, and servant to the Right Honourable the Earl of Leicester, a proper, slender man, and not so tall as the other. Thorne cast down a gauntlet, which Nailer took up, upon the Sunday before the battle should be tried. On the next morrow the matter was stayed, and the parties agreed that Paramore, being in possession, should have the land, and was bound in five hundred pounds to consider the plaintiffs as upon hearing the matter the judges should award. The Queen's Majesty abhorring bloodshed, and (as the poet well saith)

"Tristia sanguinei devitans prælia campi,"

was the taker up of the matter in this wise. It was thought good that, for Paramore's assurance, the order should be kept touching the combat, and that the plaintiffs Low and Kime should make default of appearance; but that yet such as were sureties for Nailer, their champion's appearance, should bring him in; and likewise those that were sureties for Thorne should bring in the same Thorne in discharge of their bond; and that the court should sit in Tothill-fields, where was prepared one plot of ground, of one-and-twenty yards square, double-railed, for the combat, without the west square a stage being set up for the judges representing the Court of the Common Pleas.

"All the compass without the lists was set with scaffolds, one above another, for people to stand and behold. There were, behind the square where the judges sat, two tents, the one for Nailer, the other for Thorne. Thorne was there in the morning timely. Nailer about seven of the clock came through London, apparelled in a doublet, and galley gascoine breeches, all of crimson satin, cut and rased, a hat of black velvet with a red feather and band, before him drums and fifes playing. The gauntlet cast down by George Thorne was borne before the said Nailer upon a sword's point, and his baton (a staff of an ell long, made taperwise, tipt with horn) with his shield of hard leather, was borne after him by Askam, a yeoman of the Queen's guard. He came into the palace at Westminster, and staying not long before the Hall door, came back into the King's street, and so long through the Sanctuary and Tothill-street, into the field; where he stayed till past nine of the clock, and then Sir Jerome Bowes brought him to his tent. Thorne being in his tent with Sir Henry Cheyney long before.

"About ten of the clock the Court of Common Pleas removed and came to the place prepared. When the Lord Chief-Justice, with two other his associates, were set, then Low was called solemnly to come in, or else to lose his writ of right. Then, after a certain time, the sureties of Henry Nailer were called to bring in the said Nailer, champion for Simon Low. And shortly thereupon Sir Jerome Bowes, leading Nailer by the hand, entered with him the lists, bringing him down that square by which he entered, being on the left hand of the judges, and so about till he came to the next square just against the judges, and there making courtesie first with one leg and then with the other, passed forth till he came to the middle of the place, and then made like obeisance, and so passing till they came to the bar; there he made the like courtesy, and his shield was held up aloft over his head. Nailer put off his netherstocks and so barefoot and bare-legged, save his silk scavilones to the ankles, and his doublet sleeves tied up above the elbow, and bare-headed, came in as is aforesaid. Then were the sureties of George Thorne called to bring in the said Thorne, and immediately Sir Henry Cheyney entering at the upper end on the right hand of the judges used the like order in coming about by his side as Nailer had before on the other side, and so coming to the bar with like obeisance held up his shield. Proclamation was made in form as followeth:—'The justices command in the Queen's Majesty's name, that no person of what estate, degree, or condition that he be, being present, to be so hardy to give any token or sign by countenance, speech, or language, either to the prover or defender, whereby the one of them may take advantage of the other; and no person remove, but still keep his place; and that every person or persons keep their staves and their weapons to themselves, and suffer neither the said prover nor defender to take any of their weapons or any other thing that may stand either to the said prover or defender any avail, upon pain of forfeiture of lands, tenements, goods, chattels, and imprisonment of their bodies, and making fine and ransom at the Queen's pleasure.' Then was the prover to be sworn in person as followeth:—'This hear, you justices, that I have this day neither eat, drunk, nor have upon me either bone, stone, nor glass, nor any enchantment, sorcery, or witchcraft, where through the power of the word of God might be inleased or diminished, and the devil's power increased, and that my appeal is true, so help me God and his saints, and by this book.'

"After all this solemn order was finished, the Lord Chief Justice rehearsing the manner of bringing the writ of right by Simon Low, of the answer made thereunto by Paramore, of the proceeding therein, and how Paramore had challenged to defend his right to the land by battle by his champion George Thorne, and of the accepting the trial that was by Low with his champion Henry Nailer, and then for default of appearance in Low, he adjudged the land to Paramore, and dismissed the champion, acquitting the sureties of their bonds. He also willed Henry Nailer to render again to George Thorne his gauntlet. Whereto the said Nailer answered, that his lordship might command him anything, but willingly he would not render the said gauntlet to Thorne except he could win it. And further he challenged the same Thorne to play with him half a score blows, to show some pastime to the Lord Chief-Justice and to the other there assembled. But Thorne answered that he came to fight, and

would not play. Then the Lord Chief-Justice, commending Nailer for his valiant courage, commanded them both quietly to depart the field."

And so ended this strange exhibition of a civil suit in the Court of Common Pleas—this much ado about nothing—although from the urbanity of the Lord Chief-Justice in "commending Nailer for his valiant courage," we might almost suspect him of a desire to protract it somewhat, in order to witness the exhibition proffered him for his "pastime." Had the system continued, there would have been a second class of advocates, who might have acquired professional reputations for their exertions in favour of the causes, whatever they might be, as has been done since by those who superseded them in the wordy wars in Westminster. It is a curious coincidence also, that though their assistance was waived in cases of civil judicature, the champions of quarter-staff and single-stick continued to evince their attachment to the place of their former pre-eminence; and Tothill-fields, till within twenty or thirty years, was the favourite place for such exhibitions, together with that of bear-baiting, another relic of the time of Elizabeth.

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. VIII.

GIOTTO AND HIS SCHOLARS.

[Continued from page 147.]

THE second representation is the Last Judgment. Above, in the centre, Christ and the Virgin are throned in separate glories. He turns to the left, towards the condemned, while he uncovers the wound in his side, and raises his right arm with a menacing gesture, his countenance full of majestic wrath. The Virgin, on the right of her son, is the picture of heavenly mercy; and, as if terrified at the words of eternal condemnation, she turns away. On either side are ranged the prophets of the Old Testament, the Apostles and other saints—severe, solemn, dignified figures. Angels, holding the instruments of the Passion, hover over Christ and the Virgin: under them is a group of archangels. One archangel stands in the midst holding a scroll in each hand; immediately before him another archangel, supposed to represent the guardian angel of humanity, cowers down, shuddering, while two others sound the awful trumpets of doom. Lower down is the earth, where men are seen rising from their graves; armed angels direct them to the right and left. Here is seen King Solomon, who, whilst he rises, seems doubtful to which side he should turn; here a hypocritical monk, whom an angel draws back by the hair from the host of the blessed; and there a youth in a gay and rich costume, whom another angel leads away to Paradise. There is wonderful and even terrible power of expression in some of the heads; and it is said that among them are many portraits of contemporaries, but unfortunately no circumstantial traditions as to particular figures have reached us. The attitudes of Christ and the Virgin were afterwards borrowed by Michael Angelo, in his celebrated Last Judgment; but notwithstanding the perfection of his forms, he stands far below the dignified grandeur of the old master. Later painters have also borrowed his arrangement of the patriarchs and apostles, particularly Fra Bartolomeo and Raphael.

The third representation, directly succeeding the foregoing, is Hell. It is said to have been executed from a design of Andrea, by his brother Bernardo: it is altogether inferior to the preceding representations in execution, and even in the composition. Here, the imagination of the painter, unrestrained by any just rules of taste, degenerates into the monstrous and disgusting, and even the grotesque and the ludicrous. Hell is here represented as a great rocky caldron, divided into four compartments rising one above the other. In the midst sits Satan, a fearful armed giant—himself a fiery furnace, out of whose body flames arise in different places, in which sinners are consumed or crushed. In other parts, the condemned are seen spitted like fowls, and roasted and basted by demons, with other such atrocious fancies, too horrible and sickening for description. The lower part of the picture was badly painted over and altered according to the taste of the day, in the sixteenth century; certainly not for the better.*

ANDREA ORCAGNA is supposed to have painted these frescoes about 1335, and he died about 1370.

Simone Martini, usually called SIMONE MEMMI, was a painter of Sienna, of whom very few works remain, but the friendship of Petrarch has rendered his name illustrious. Simone Memmi was employed at Avignon, when it was the seat of the popes (about 1340), and there he painted the portrait of Laura and presented it to Petrarch, who rewarded him with two Sonnets—and immortality. Simone also painted a famous picture on the wall of the Spanish chapel in the church of Santa Maria Novella, which may still be seen there: it represents the church militant and triumphant—with a great number of figures, among which are the portraits of Cimabue, Petrarch, and Laura. He also painted in the Campo Santo, and his pictures there are among the finest in expression and in grouping. He died about 1345. There is a picture in the Louvre at Paris No. 1115, attributed to him: it represents the Virgin crowned in Heaven amid a chorus of angels, a subject frequently treated by Giotto and his scholars.

Pietro Lorenzetti painted in the Campo Santo the Hermits in the Wilderness: they are represented as dwelling in caves and chapels, upon rocks and mountains; some studying, others meditating, others tempted by demons in various horrible or alluring forms, for such were the diseased fancies which haunted a solitary and unnatural existence. As the laws of perspective were then unknown, the various groups of hermits and their dwellings are represented one above another, and all of the same size, much like the figures on a china plate.

Antonio Veneziano also painted in the Campo Santo, about 1387; and showed himself superior to all who had preceded him in feeling and grace, though inferior to Andrea Orcagna in sublimity. A certain Spinello of Arezzo was next employed, about 1380. He painted the story of St. Ephesus. Spinello seems to have been a man of genius, but of most unregulated mind. Vasari tells a story of him which shows at once the vehemence of his fancy and his morbid brain. He painted a picture of the Fallen Angels, in which he had laboured to render the figure of Satan as terrible, as deformed, as revolting as possible. The image, as he worked upon it, became fixed in his fancy, and haunted him in sleep. He dreamed that the Prince of Hell appeared before him under the horrible form in which he had arrayed him, and demanded why he should be thus treated, and by what authority the painter had represented him so abominably hideous? Spinello awoke in terror: soon afterwards he became distracted, and so died, about the year 1400.

But the great painter of this time, the third alluded to above, was TADDEO GADDI, the favourite pupil of Giotto, and his godson. His pictures are considered the most important works of the fourteenth century: they

* The foregoing account of the paintings of Andrea Orcagna is taken, with alterations, from Kugler's 'Handbuch.'

resemble the manner of Giotto in the feeling for truth, nature, and simplicity; but we find in them improved execution, with even more beauty and largeness and grandeur of style. His pictures are numerous: several are in the Academy at Florence and the Museum at Berlin; none, we believe, in England. In Otley's engravings of the early Italian school are three grand seated figures of the Fathers of the Church, from Taddeo's most famous picture, the fresco in the Spanish chapel at Florence, usually entitled the 'Arts and Sciences.' Between Taddeo Gaddi and Simone Memmi there existed an ardent friendship and a mutual admiration, which did honour to both. All that Taddeo painted in the Campo Santo is destroyed. At Paris, in the Louvre, are four small pictures attributed to him; and at Berlin four others, larger, more important, and more authentic. Another of Giotto's most famous followers was Tommaso di Stefano, called Giottino, or 'the little Giotto,' from the success with which he emulated his master.

Towards the close of this century, the decoration of the Campo Santo was interrupted by the political misfortunes and internal dissentions which distracted the city of Pisa, and were not resumed for nearly a hundred years. The paintings in the church of Assisi were carried on by Giottino and by Giovanni di Melano, but were also interrupted towards the close of this century.

We have mentioned here but a few of the most prominent names among the multitude of painters who flourished from 1300 to 1400: before we enter on a new century we will take a general view of the progress of the art itself, and the purposes to which it was applied.

The progress made in painting was chiefly by carrying out the principles of Giotto in expression and in imitation. Taddeo Gaddi and Simone excelled in the first; the imitation of form and of natural objects was so improved by Stefano Fiorentino, that he was styled by his cotemporaries *il Scimia della Natura*, 'the ape of Nature.' Giottino, the son of this Stefano, and others, improved in colour, in softness of execution, and in the means and mechanism of the art; but oil-painting was not yet invented, and linear perspective was unknown. Engraving on copper, cutting in wood, and printing, were the inventions of the next century. Portraits were seldom painted, and then only of very distinguished persons, introduced into large compositions. The imitation of natural scenery, that is, *landscape painting*, as a branch of art, now such a familiar source of pleasure, was as yet unthought of. When landscape was introduced into pictures as a background or accessory, it was merely to indicate the scene of the story: a rock represented a desert—some formal trees, very like brooms set on end, indicated a wood—a bluish space, sometimes with fishes in it, *signified* a river or a sea: yet in the midst of this ignorance, this imperfect execution, and limited range of power, how exquisitely beautiful are some of the remains of this early time! affording in their simple, genuine grace, and lofty, earnest, and devout feeling, examples of excellence which our modern painters are beginning to feel and to understand, and which the great Raphael himself did not disdain to study, and even to copy.

As yet the purposes to which painting was applied were almost wholly of a religious character. No sooner was a church erected, than the walls were covered with representations of sacred subjects, either from Scriptural history or the legends of saints. Devout individuals or families built and consecrated chapels; and then, at great cost, employed painters either to decorate the walls or to paint pictures for the altars; the Madonna and Child, or the Crucifixion, were the favourite subjects—the donor of the picture or founder of the chapel being often represented on his knees in a corner of the picture, and sometimes (as more expressive of humility) of most diminutive size, out of all proportion to the other figures. The doors of the sacristies, and of the presses in which the priests' vestments were kept, were often covered with small pictures of Scriptural subjects; as were also the chests in which were deposited the utensils for the Holy Sacrament. Almost all the small moveable pictures of the fourteenth and fifteenth centuries which have come down to us are either the altar-pieces of chapels and oratories, or have been cut from the panels of doors, from the covers of chests, or other pieces of ecclesiastical furniture.



[The Angel and the Youth, by Andrea Orcagna.]

ON THE SYSTEM OF DAWK TRAVELLING IN INDIA.

THERE is a remarkable system of travelling adopted in India, arising out of the immense distance which the three presidencies are apart, the imperfect state of the roads, the deficiency in the number of horses, the checks which the peculiar mode of government in India have given to private enterprise, and the very small value there placed upon human labour. It is the *Dawk* system to which we allude, as owing its birth to the united causes here assigned. The word is spelt *dawk*, *dakh*, and *dâk* by different writers; but whatever be the proper orthography, the meaning bears a tolerably close analogy to the English word *Post*. We call the transmission of letters the 'post,' and when travelling at a rapid rate in a hired carriage we call it travelling 'post.' So in like manner in India the Dawk means the conveyance of letters, and also a quick mode of travelling adopted by persons who have

to go from one presidency to another. The Dawk consists of a body of native *runners*; active, agile, patient, and enduring men, who run from town to town bearing the packets of letters, or 'post,' and who carry travellers on their shoulders in palanquins or open vehicles. The whole arrangement, both as respects the post and private travelling, seems to be in the hands of government.

When the houses of parliament were investigating the condition and position of India in 1831, preparatory to the renewal of the Company's Charter, many points of evidence were elicited which afford us information respecting the Dawk system. Among the persons examined before the Commons' Committee was Mr. David Hill, who, in answer to a question, whether he thought the Post-Office establishment of India was upon as good a footing as it might be made to occupy, stated, 'It is better at Madras than elsewhere; the mails are conveyed at a faster rate. I do not think it possible to put it on a better footing: there is a want of good roads and a want of horses, they not being used for the agricultural purposes of the country. The mails are, however, transmitted with perfect regularity, and with very considerable expedition. An express is conveyed at the rate of five miles an hour, which is as fast as the mail was in this country fifty years ago; and the ordinary post when the runners are overloaded with newspapers and letters, is conveyed at the rate of four miles an hour. I do not think it could be conveyed faster. The rates of postage are high compared with this country, so that the revenue would not be likely to be increased by any alteration of the system. The post office is not at present used by the natives. If the wealth of the country were increased, they probably would use it. As it is, they send their communications by their friends." It was then asked, what distance the post-runners ran in a day, to which the reply was—"Their stages vary according to the road they have to go, in Madras, from five miles to near ten in some cases. Where the distance is longest they do not return." In reply to the question, whether it was a practice to carry other articles besides letters, it was stated that all the men carry newspapers; and that with respect to parcels, "there is a bangey or box-mail, for that purpose, with a different rate of postage on all roads in Bengal and on the principal Madras roads, and the parcels are sent in that way."

Some years ago a memorandum was issued by the Madras government, which illustrates the exact mode in which these dawk-runners managed their labours. It is stated that "two practices of very unequal merit prevail among the dawk runners on this establishment in carrying the mails. The one consists in travelling with the dawks in one direction only, the other, in travelling with them in opposite directions. Where the former custom is observed, the strength of the runners is unprofitably expended by their traversing the same ground without loads over which they carry the mails, while from the same cause their long absence from their stations and their unfitness for duty when they reach them must expose the dawks to unnecessary interruption. Where the latter method is pursued, the labour of the runners is limited to the performance of their appointed task; and setting aside uncontrollable contingencies, and bating the time that is requisite for food and rest, they ought always to be in readiness for the ordinary work and the occasional exigencies of their employment."

The system here advocated as being the better of the two is thus illustrated in a mode which we may briefly abstract. A journey for the dawk-runners is divided into stages or distances, each stage having two runners. The two runners of a stage move alternately from its opposite ends, and traverse its length daily, each conveying a mail. For example:—If, as in the annexed figure, the north and south limits of a stage be represented by N and S, and the two runners attached to the portion of route comprehended within those limits by A and B; then, in the daily reciprocation of the mails, A and B will alternately change positions. One day A will take a mail southward from N to S, and B will carry one northward from S to N; the next day B will, as A had done on the previous day, bring a mail from N to S, while A will convey one from S to N, as B had done the day before. Thus A and B daily change places, and each waits alternately at N and S, after delivering his load, till a fresh mail arrives, when he immediately proceeds with it through his stage.

The above illustration relates to the two runners of one stage, but the same interchange of mails takes place between the two runners of one stage, and the two of the next adjoining. Thus:—If L be the point of junction between two stages, and M and N the opposite extremities of the two stages; then, for the two, four runners will be required, as indicated by the letters O and P, Q and R. L will be common to both stages thither the mails coming from M will be brought by the runners O and P alternately, and those going from N will be taken by the runners Q and R alternately. At L the mails coming from the northern jurisdiction pass into the hands of the runners belonging to the southern stage, while those from the south are transferred to the hands of the northern runners. Thus, while the letters travel onwards in each direction at the rate of five miles an hour, each runner limits himself to one particular stage, and does not pass on to the adjoining one.

If, by the falling of rain or other contingency, an interruption should occur in the rapidity of the runner's progress, two runners of one stage may occasionally find themselves at the same end of the stage at the same time: in such case, one of them hastens back with increased speed, to arrive at the other end in time for the next mail that may arrive there. In the *bangey*, or 'parcels delivery' (as we might call it in England), the runners carry a basket in which the parcels are deposited, and this basket is transferred from one runner to another till it arrives at the end of the journey.

In a letter to the Parliamentary Commissioners Mr. Christian makes the following remarks on the dawk:—"Some have, I believe, recommended the use of horses and others of camels for that purpose. However, when the nature of the country and the peculiar climate are considered, I am of opinion that it will be the best plan to adhere to the present system, as the peons or footmen can travel at all seasons with tolerable dispatch. At some periods of the year and in some parts of the country, something might be gained in time by using horses for the conveyance of the mail; but during the rains there would be many difficulties, such as the sudden rise of rivers, the overflowing of mountain-streams, which men easily cross over in rafts or floats constructed for the occasion, but which would not accommodate a horse. Of course it must always be advisable to have the dawk or foot-stages at suitable or convenient distances, so that the footmen be not overworked, and that the bags be never allowed to exceed a certain weight without allowing an additional runner."

Thus much for the dawk-runners, considered in

reference to the conveyance of letters, newspapers, and parcels. The same men, or at least men under the control of a kind of government postmaster, are employed to carry persons across the continent of India, in a manner which bears some analogy to that of the sedans of the last century, except that the poles are placed on the shoulders of the men, instead of being held in the hands and suspended by straps. In a 'Guide-Book to Asia,' by Mr. Usborne, published in 1840, we find a little information respecting the mode in which the services of these dawk-bearers are obtained.

Mr. Usborne says:—"Dawk-travelling is so well understood in India, that any hints on the subject of the preparations requisite for accomplishing a trip with comfort appear almost unnecessary. The entire journey being generally paid for in advance at the starting-place, the traveller need only provide himself with a sufficiency of clothes, apparatus for the toilet, biscuits, brandy, books, a blanket, and a small stock of cash, to be assured of effecting the journey with as much ease and as little inconvenience as such a mode of travelling will admit. It is merely necessary to hint to the stranger that as the dawk-bearers are kept by the government subordinates much in arrear of pay, a gratuity of eight annas (small Indian coins) at the end of each stage will ensure speed and attention throughout. For this purpose it will be well for the traveller to provide himself with a sufficiency of eight-anna pieces, and if he is likely to cross many nullahs or rivers in his journey, he may add thereto a few four-anna pieces, to be delivered to the mangees, or boatmen at the several ferries.'

In dawk-travelling, there are some men who act as 'palanquin-burdars,' or sedan-bearers, and 'baggey-burdars,' or luggage-bearers; and both are provided by the government postmasters. For instance, in travelling by dawk from Calcutta to Bombay, the traveller pays in advance for a distance of 364 miles, to Ganjam. At this latter place he transacts business with a new postmaster or collector, who supplies him with bearers to Moonegalah, a distance of 497 miles. At Moonegalah a new contract ensures him conveyance to Hyderabad, a distance of 100 miles; and so on throughout the fourteen hundred miles which separate Calcutta from Bombay. The dawk is paid for to the collectors at the rate of eight annas (about one shilling) per mile.

The dawk from Madras to Bombay is conducted on the same system as that from Calcutta to Bombay, and while describing it, Mr. Usborne says:—"All along the main road, through the Mysore country, there are bungalows, built at the distance of every ten or fifteen miles, intended for the accommodation of European travellers, and consisting usually of a middle-room and two smaller ones, surrounded by a broad verandah, and erected on a raised foundation; the offices for cooking, &c. are separated from the house, and the whole together, with about an acre of land, are enclosed in a wall or fence. The munificence of the Mysore government has supplied these very convenient resting-places, which, in a country where public-houses of entertainment are unknown, are quite essential to the comfort of the traveller. There is usually an invalid Sepoy to take care of the place; and a kind of public purveyor, called a cutwal, is always in attendance to supply persons with such provisions as they may need."

As an example of the mode of dawk travelling, we may adduce the description given by Bishop Heber in the narrative of his journey through the upper provinces of India. When he had traversed a considerable portion of the distance between Calcutta and Benares, the bishop hired a set of dawk-bearers. He had twelve in number, on account of the route lying through a broken country. His clothes and writing-desk were placed in two petarrahs, or wicker-boxes, which one man carried slung on a bamboo across his shoulders. "Such is the usual style," says the bishop, "in which dawk-journeys are made in India, and it may serve as an additional proof of the redundant population and cheapness of labour, that this number of bearers are obtained, for such severe and unpleasant work, at about twelve shillings for the stage, varying from six to ten miles. The men set out across the meadows at a good round trot of about four miles an hour, grunting all the way like paviours in England, a custom which, like paviors, they imagine eases them under their burden." The road soon became too uneven for rapid progress, and they were above three hours in traversing a distance of eight miles, there were some difficult fords by the way, owing to recent rains; and no better road than the paths leading from one village to another. On coming to any deep nullah, or steep bank, the bearers, as the bishop remarks, displayed considerable adroitness in supporting their burden. Only four can usually put their shoulders to a palanquin at the same time. But those who were not under the poles thrust stout bamboos under the bottom of the palanquin, and took hold of the ends on each side, so that the strength of six men more was, for the time, brought into action. 'They required, indeed, such aid, since the road was certainly far from good, while the bearers were not a very stout set, and probably were agricultural labourers, not in the habit of dawk-travelling. The motion is neither violent nor unpleasant; it is incessant, however, and renders it impossible to draw, and not very convenient to read, except a large print.' Shortly before the termination of their dawk journey, the cavalcade came to the banks of a stream. "I expected," says the narrator, "to be delayed here, but nothing of the kind occurred. The boat (the spot being a regular ferry), a broad and substantial one, had a platform of wood covered with clay across its middle. The palanquin, with me in it, was placed on this with its length athwart the vessel; the mangee steered, and some of the dawk-bearers took up oars, so that we were across in a very short time."

In Heber's volumes there is a plate representing the progress of this dawk cavalcade, and the manner in which the twelve bearers assist one another in a difficult part of the route.

USEFUL APPLICATIONS OF THE BEECH-TREE.

The common Beech, known in America as the White Beech, is the most important of all the species, and may be taken as a type of the whole genus. It is a native of the temperate parts of Europe, from the south of Norway to the Mediterranean, and from England to Constantinople. In the forests of Poland and Lithuania it grows very abundantly. In Switzerland it occupies the southern sides of those mountains whose northern slope is clothed with the silver fir. It rises to a height of above five thousand feet on the Alps, four thousand below the snow-line. In France it is found on the southern slope of mountains. In Great Britain it occurs in forests, chiefly on chalky hills, and chiefly also in the southern and south-midland counties. In Buckinghamshire it forms extensive forests of great magnificence and beauty. In North America it constitutes one of the tallest and most majestic forest-trees, abounding in the middle, western, and southern states. These forests compose large masses in Genessee, Kentucky, and Tenessee. Taken in comparison with other trees, the beech may be said

to be somewhat isolated; it is seldom mixed with those of a different genus, its own dense head suffocating most other kinds. It has been observed that nothing will grow under the beech but the holly and the truffle.

In taking a glance at the useful qualities of the beech, it will be well to notice first the timber afforded by the trunk and larger branches. It may be said in general terms that the useful applications of beech-timber are remarkable rather for their number and variety than for their individual importance. The wood is said to be harder in a green state than most or perhaps any other kinds of English timber, and in that state weighs about sixty-six pounds per cubic foot —rather heavier than an equal bulk of water. The process of drying, to a state fitted for manufacturing purposes, reduces the weight per cubic foot to about fifty pounds. When the tree has been grown on a good soil, the wood assumes a reddish tinge, but a poor soil imparts to it a whitish hue. It is a hard and brittle wood; and though sometimes found of such size as to yield beams a hundred feet in length, it is not much employed in common carpentry. Mathews, the author of a valuable treatise on naval timber, says that the timber of the beech soon corrupts, if it be not speedily dried or kept in water after being cut down; that it is equally liable to corruption in the tree, when deprived of life by wounds or other injury; and that it has both a matured wood and a sap-wood, of which the former has considerable durability when kept dry, but the latter is liable to early decay.

Beech is employed for the keels of shipping, and often for the planking of the sides and bottom. When employed for ringing mill-wheels, it has been known to last in wear uninjured for more than forty years. The extensive employment of the wood in making piles, weirs, sluices, flood-gates, and other constructions exposed to the action of water, illustrates a remark before made, that, though not always durable in the open air, the beech is well calculated to resist the action of water. It was formerly used for making the cogs of wooden wheels, before cast-iron wheels and pinions came so much into use.

In England, at the present day, beech-wood is principally employed in making bedsteads and chairs. It is also in great requisition for panels for carriages, and for various purposes in joinery, cabinet-making, and turnery. When the beech is used for articles of furniture, it is frequently stained to imitate mahogany; and for smaller articles, such as the handles of jugs, teapots, &c., it is stained in imitation of ebony. Since the extension of the railway system in England, beech has been in large demand for the 'sleepers,' or supports of the iron rails; and is in such case generally prepared for that purpose by the preservative process of Kyanizing. In Hampshire beech-wood is much used for barn-floors; and such floors, where kept free from damp by a thorough ventilation beneath, are said to last many years. In Scotland this wood is used for nearly the same purposes as in England, as well as for wooden screws, wooden shovels, peels for bakers' ovens, and rims for sieves. It is also there used for making herring-barrels.

In Germany the carriages of cannon are frequently made of beech, particularly at seaports; on account, it is said, of the power of beech-wood to resist the action of a humid and perhaps saline atmosphere better than many other kinds of wood. It is used for the felloes of wheels, for bowls, porringers, salt-boxes, screws, spindles, rollers, spinning-wheels, pestles, presses, and bellows. In fact, the uses of the beech on many parts of the Continent are remarkably varied: tables, the framework and boards of beds, wardrobes, chests of drawers, desks, frames for horses' collars, frames for saddles, hoops for sieves and riddles, bushel measures, cases for drums—all are to be added to the list of articles made on the Continent from beech-wood. When sawn into thin boards or layers it is used not only for boxes, packing-cases, and similar articles, but for scabbards for swords, and for the boards or sides of thick volumes, instead of mill-board; indeed, it is said by Mr. Loudon, to whose valuable volumes we are much indebted for these details, that the common English word "book" is derived from the German "buch," which signifies both "book" and "beech," and that the name now given to a volume is traceable to this particular use of thin planks of the beech. This, with a slight modification, may perhaps be the case; for while *das buch* signifies "the book," *die buche* signifies "the beech."

In France the beech is used as a substitute for walnut-wood for gun-stocks. It forms the upper board of a kind of press used for pressing and drying plants. The socks of the old heavy wooden ploughs are made of it; and it is the kind of wood employed for making cricket-bats, although in England willow is used for this purpose. In some parts of France little boats are said by Baudrillart to be hollowed out of the trunks of large beech-trees, for using in small rivers and in fishing-ponds; and he adds that it is preferred to all other woods for the oars of galleys. At St Etienne, the wood of the beech is used to make the handles of those cheap knives that are sold all over France at two or three sous a-piece, and which are called "Eustache Dubois," from the name of their inventor; for this purpose the wood is hardened after it has been formed into the handles, and is attached to the blade by being powerfully compressed into a mould of steel previously rendered almost red-hot. But the most remarkable application of beech-wood in France is for making *sabots*, or wooden shoes. When made of beech the sabots are rather more brittle than those of the walnut or of the alder; but they have the property of not absorbing water, and are in other respects superior to those made of most kinds of wood, excepting only the walnut, which is too expensive for common purposes. The consumption of beech sabots is immense in the mountainous districts of France; and Bosc speaks of the following means adopted by the makers to make them durable:—"They (the sabots) are made of wood which has been cut only a few months, and is consequently nearly green, but which the manufacturers dry rapidly with the smoke produced by burning the chips which are formed in making the sabots. This smoke, containing a great deal of moisture or steam along with the heat, does not crack the sabots which are exposed to it; while the pyroligneous acid which is evolved (and which is produced in greater quantity by the wood of the beech than by that of any other tree) penetrates the sabot, and renders it not liable to be attacked by insects. The sabots so treated are always of a brownish colour, the effect of this process." A suggestion has arisen out of this custom, to the effect that rafters and planks of beech, for use in house-building, might perhaps be rendered more durable by impregnating them with pyroligneous acid derived from the smoke of beech-spray and chips; indeed this practice is said to be now adopted in Scotland and Ireland, in reference to the wooden rafters of cottages.

Beech-wood, considered as fuel, occupies a high rank. It is deemed better than most other kinds of wood. It is consumed to an enormous extent for this purpose in France and Germany, but more especially in Paris, where the practice of having open fires is more generally adopted than in the German towns. It burns rapidly, throws out a great deal of heat, and produces a clear bright flame. The green wood is generally preferred to the dry, for, though yielding less

heat, it burns very more slowly. A great deal of charcoal is said to be manufactured in Buckinghamshire from the beech for the making of gunpowder.

The bark of the beech has been applied to useful purposes, but apparently not very numerous or extensive. It forms one of the tanning ingredients both in England and in America. It has been placed in the fifth rank among barks, in respect to its tanning qualities. Evelyn, in his 'Sylva,' while speaking of the beech, says:—"Of old, they made their *vasa vindemiatoria* and *corbes messorier*, as we our pots for strawberries, with the rind of this tree. Nay, and vessels to preserve wine in; and that curiously wrought cup which the shepherd, in the 'Bucolicks,' wagers withall was engraven by Alcimedon upon the bark of the beech."

The leaves of the beech have been often used as a substitute for feathers in a bed. This is the case in some districts at the present time; but in former ages it was very common in Britain. Evelyn says that "being gathered about the fall, and somewhat before they are much frost-bitten, they afford the best and the easiest mattresses in the world, to lay under our quilts instead of straw; because, besides their tenderness and loose lying together, they continue sweet for seven or eight years long, before which time straw becomes musty and hard. They are thus used by divers persons of quality in Dauphiny; and in Switzerland I have sometimes lain on them to my very great refreshment, so as of this tree it may properly be said, 'Silva domus, cubilia frondes'—the wood as house, the leaves a bed." Evelyn's opinion is borne out by a modern writer, Sir Thomas Dick Lauder, who, in his edition of Gilpin's 'Forest Scenery,' says:—"We can from our own experience bear testimony to the truth of what Evelyn says here, as to the excellence of beech-leaves for mattresses. We used always to think that the most luxurious and refreshing bed was that which prevails universally in Italy, and which consists of an absolute pile of mattresses filled with the elastic spathe of the Indian corn, which beds have the advantage of being soft as well as elastic, and we have always found the sleep enjoyed in them to be peculiarly sound and restorative. But the beds made of beech-leaves are really no whit behind them in these qualities, whilst the fragrant smell of green tea which the leaves retain is most gratifying. The objection to them is the slight crackling noise which the leaves occasion as the individual turns in bed; but this is no inconvenience at all, or, if so in any degree, it is an inconvenience which is much overbalanced by the advantages of this most luxuriant couch." The long time which beech-leaves take in decaying, and which is one of the circumstances to which they owe their availability for the purpose just mentioned, also fits them to be used for protecting herbaceous plants from frost, or 'mulching' round the stems of half-hardy trees and shrubs. The catkins of the flowers are in some places collected, dried, and used for a somewhat similar purpose as the leaves, in stuffing cushions, pillow-cases, &c.

In a state of nature the beech affords food to wild pigeons and other birds, and to squirrels, deer, wild swine and other animals, in autumn, but in spring and summer its leaves are eaten only by a few insects. The *mast*, or fruit, is extensively useful, but its commercial history is so very curious, that we must defer our notice of it to a future article.

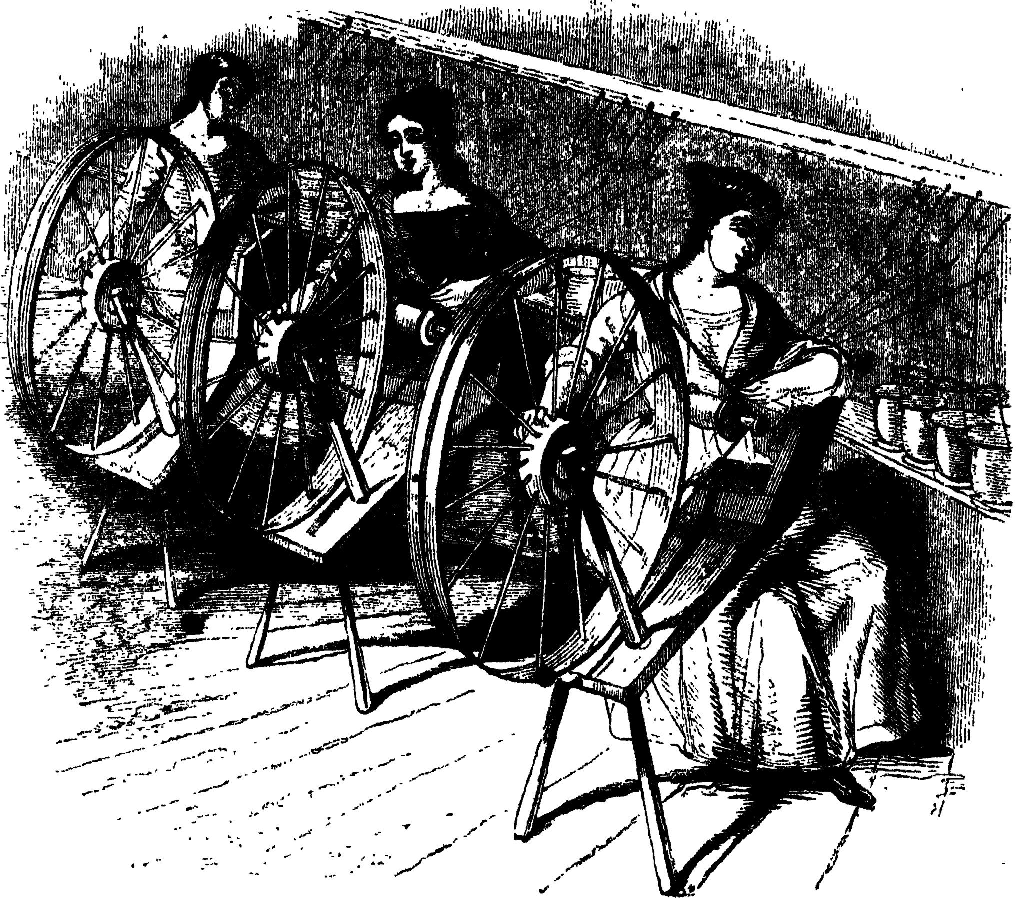
Corn-Mill of the Shetland Islands.—We had this day an opportunity of inspecting one of the primitive mills of Shetland. The grinding-stones, usually formed of micaceous schist, are placed upon a frame-work, and beneath a roof. A strong iron spindle is wedged into the upper stone, and, passing through a hole in the centre of the lower one, is firmly fixed into the upper end of a strong wooden post, at the base of which are mortised, in a slanting direction, a number of flat boards, forming the cogs of a kind of horizontal wheel. A trough from a natural rill of water is made to convey the moving power upon the wheel, which turns the upper millstone slowly round, and so grinds the grain, supplied either by an old straw basket or other rustic hopper, or more patiently by human hands.—*Wilson's Coasts of Scotland.*

Marks for Sheep.—The sheep, cattle, and horses which run on the common pastures in the Shetland Islands are all marked on the ears to distinguish individual property. In the island of Unst there are as many as three hundred different marks. Mr. Wilson, in his 'Coasting Voyage round Scotland,' says:—"When any new person desires to have a mark, he has one assigned and appropriated to himself, which must be publicly advertised or made known, to ensure that no one else [illegible] is already selected [illegible] same. He then pays half a crown for registration, which [illegible] goes to the maintenance of the poor. But if he requires to take even a lamb from the hill-side for family use, he must warn his neighbours of his intention, that they, if they please, may go with him to see that he helps himself to nothing but his own."

Perpetual Day in the Arctic Circle.—Nothing made a deeper impression upon our senses as the change from alternate day and night, to which we had been habituated from our infancy, to the continued daylight to which we were subjected as soon as we crossed the Arctic circle. Where the ground is but little trodden, even trifles are interesting, and I do not, therefore, hesitate to describe the feelings with which we regarded this change. The novelty, it must be admitted, was very agreeable, and the advantage of constant daylight, in an unexplored and naturally boisterous sea, was too great to allow us even to wish for a return of the alternations above alluded to; but the reluctance we felt to quit the deck when the sun was shining bright upon our sails, and to retire to our cabins to sleep, often deprived us of many hours of necessary rest, and when we returned to the deck to keep our night-watch, if it may be so called, and still found the sun gilding the sky, it seemed as if the day would never end. What, therefore, at first promised to be so gratifying, soon threatened to become extremely irksome, and would indeed have been a serious inconvenience, had we not followed the example of the feathery tribe, which we daily observed winging their way to roost, with a clock-work regularity, and retired to our cabins at the proper hour, where, shutting out the rays of the sun, we obtained that repose which the exercise of our duties required. At first sight it will, no doubt, appear to many persons that constant day-light must be a valuable acquisition in every country; but a little reflection will, I think, be sufficient to show that the reverse is really the case, and to satisfy a thinking mind that we cannot overrate the blessings we derive from the wholesome alternation of labour and rest, which is in a manner forced upon us by the succession of day and night. It is impossible, by removing to a high latitude, to witness the difficulty there is in the regulation of time, the proneness that is felt by the indefatigable and zealous to rivet themselves to their occupations, and by the indolent and procrastinating to postpone their duties, without being truly thankful for that all-wise and merciful provision with which Nature has endowed the more habitable portions of the globe.—*Voyage of Discovery towards the North Pole, in 1818, by Capt. Beechey.*

Fountain of Ashamaeus.—About two miles to the south of the village (Kilisá hisár) several small springs of brackish water rise, and a little way on is a small lake or pool, about thirty or forty feet in diameter, of turbid brackish water, which appears to be boiling up all over, but particularly in the centre, where a violent jet of water rises to a height of nearly a foot, and about a foot and a half in diameter, with considerable noise. Notwithstanding this quantity of water which is constantly boiling up, the lake never rises or overflows its banks, nor does any stream of water escape from it, although the ground around is perfectly flat. There is a slight smell of sulphuretted hydrogen gas around it, and I think it probable that the jet in the centre of the pool is partly caused by the escape of a large quantity of gas, and not solely by water.—*W. J. Hamilton's Journey in Asia Minor.*

A DAY AT A DERBY SILK-MILL.



[Silk-doublers at work.]

MANUFACTURING industry, as well as polite literature, has its classical spots. The birthplace or the residence of a great inventor, the first factory in any particular department, or the place where the first practical application of a new invention was made, has, in a busy and commercial country like England, a sort of halo around it: it is a mark and object of men's attention, in which we can read records of bygone times; and we can form some estimate of the present, by comparing with it the memento thus presented to us of the past.

Such a memento is the Old Silk-Mill at Derby. When, standing on the bridge which crosses the Derwent near the northern end of the town, we look down the stream and glance at the long brick building on the right-hand, or western bank; and when we are told that this was Lombe's Silk-Mill, we are tempted to ask, "Is this the *real* mill? Is this the veritable building erected by John Lombe more than a hundred and twenty years ago, and at which William Hutton went to work in 1730?" We find that it is so; and that it has never ceased to be worked from that day to the present. Nay, the original water-wheel, which was such a marvel at the time of its erection, has been at work until within a very few years; and the old dusky-red pile of buildings, with its hundreds of windows, still stands isolated from all other buildings, on the little island which Lombe rented from the Derby Corporation.

But before noticing the internal features of the Old Mill, it may be well to speak of the raw material brought thither to be manufactured, and of the source whence that material is obtained.

A silk-mill, in manufacturing phraseology, is the building in which raw silk, as imported, is prepared for the weaver, the stocking-maker, or the seamstress, by spinning or twisting, and other processes. A subdivision is sometimes made between a 'silk-throwing mill' and a 'silk-spinning mill;' the former being for the manufacture from good and perfect raw silk, and the latter from waste and inferior silk; but both are alike dependent on foreign countries for the supply of the raw materials. The silk arrives at the mill in the form of a filament or thread, and it leaves the mill also as a thread; but the difference between the two forms, as to thickness, compactness, and strength, is considerable. We may even go farther back, and state that the imported threads are themselves formed of other threads made abroad; so that in fact we cannot rightly understand the matter without tracing the routine back to the silkworm itself.

It is pretty generally known to readers in the present day that silk is a secretion from the silkworm, elaborated through two small holes near the head. How the worm is reared, how it changes its condition with great rapidity, how it is supported by eating vast quantities of mulberry-leaves, and how the Italian peasants prepare for the momentous period when the worms are to produce their silk—are matters upon which there is not room here to enter. Suffice it to say that, when the critical time arrives, the little worm seeks a corner or hollow space in which to form its *cocoon* or nest. Having selected such a spot, it attaches long threads of glutinous matter, or silk, from side to side, to form a support for itself; and upon this support it weaves around itself a hollow envelope of light tissue-like texture. Within this wall it continues to labour, spinning more and more length of filament from the two holes before mentioned, and laying the thread round the interior of its hollow dwelling, gradually thereby increasing the thickness of the inclosing wall. The nest assumes the form of a light egg-shaped ball, very soft and loose on the exterior; but as the worm progresses with its work towards the centre, the structure becomes more dense and compact, from the plies or reduplications of the thread being closer together. At length the working ceases, and we have then a *silk cocoon*, with the worm imprisoned in its centre, the cocoon being from an inch to an inch and a half long, and of a yellow or orange colour.

Now it is important to bear in mind that it is one *continuous thread* thus produced; or, in fact, it is two threads twisted into one. There are two twin threads spun out from the two orifices, and the worm, by a peculiar combined movement of its mouth and front legs, brings these two together and agglutinates them by a gummy liquid. The worm, if not interrupted, spins out the whole quantity in one unbroken thread of enormous length, composed of the two twin filaments. This circumstance gives rise to one main difference between the cotton and silk manufactures; for cotton comes to us in the form of short fibres, which have to be spun—formerly by hand, but now by machinery—into a continuous thread; whereas in the silk manufacture the little insect performs this spinning process, and presents the material in a continuous form.

But it may next fairly be asked, by what means is the insect removed from its voluntary prison, and how is the continuous thread of silk removed from the cocoons? This is effected in a singular manner. In Italy, from whence a large quantity of silk is brought, the rearing of the silkworm is the occupation of one class of persons, while the winding of the silk is that of another; and the rearers sell the cocoons to the winders as soon as the enclosed insect is killed. Sometimes the cocoons are exposed to the heat of an Italian sun for four or five hours; or if the climate be too cold, they are placed in an oven, and there kept till vitality is destroyed. In short, the poor little silk-makers are stifled to death in their egg-shaped envelopes, after having produced the material which man has chosen to appropriate to himself. When the insect is killed, the external soft envelope, which is known as *floss-silk*, is opened, and the hard cocoon is protruded through the opening. This floss-silk is to be afterwards brought to a manufactured state by the process of silk-spinning, while the cocoon is appropriated to the silk-throwster.

The vendor of the cocoons separates them into different qualities, to which he applies different names. Thus, the 'good cocoons' are the most perfect; 'pointed cocoons' are apt to break in the winding; 'cocalons' are large, but of a less compact nature than good cocoons; 'dupions, or doublets,' have two threads confused one with another; 'soufflons' are very imperfect cocoons; and so on, each kind being paid for at a certain price according to the facility with which it will yield a good silken thread.

When the winder or reeler has purchased the cocoons from the rearer, a woman proceeds as follows:—Into a vessel of warm water a number of cocoons are thrown, and there immersed until the gum which the insect had used as a kind of cement in forming the cocoon is so far softened as to permit the thread to come off. The reeler then takes a whisk of fine twigs bound together, and cut off evenly at the ends, and with this she gently presses and stirs the cocoons, till the loose threads are entangled on its points. She then raises her whisk with the threads attached to it, disengages them from it, and draws their ends through her fingers to remove any adhering floss or impurity. Then, supposing the thread which she is about to form is to consist of twenty filaments (the number varying greatly in different circumstances), she collects the threads of twenty cocoons, and passes them through small eyes or loops in a reeling-machine. The first form is, say, four groups of five each, each group passing through one eye; then two of these groups are combined into a larger group; and lastly, all of the twenty are brought together in one thread. This combined thread is wound upon a hollow frame or reel, the cocoons immersed in the warm water being brought precisely to that state which will [illegible] their yielding the filaments easily. As fast as [illegible] the cocoons become exhausted others are thrown into the warm water, and their threads united to that of the cocoons previously reeled.

It is thus that the silk assumes the form known, and a similar to that of a hank or skein. Of the quantity thus yielded the following may give some notion. Each cocoon yields on an average about three hundred yards of silk; two hundred and fifty average-sized cocoons weigh about a pound; and eleven or twelve pounds of cocoons give one pound of reeled silk, the other eleven twelfths being made up of the weight of the chrysalis or enclosed insect, floss-silk, waste, dirt, &c. From these data it has been estimated that the original silk filament as elaborated by the insect would require nearly five hundred miles of length to weigh a pound!

The hanks of silk thus produced from the cocoons by the silk reelers of Italy, France, Bengal, China, and other countries are the commodity which arrives in England under the name of *raw-silk*. That which is imported under the name of *thrown silk* is the same after having been worked in the silk mills of foreign countries; and formerly a good deal of this used to be imported into England. But in proportion as the English silk mills improved in their processes, the English throwsters were able to outweigh the advantages which used to attach to the Italian throwsters; and the result is thus shown—that whereas at the opening of the present century the thrown silk imported was half as much in weight as the raw-silk, in 1830 it was only one eighteenth part as much; the advantage in change being altogether on the part of the English throwster.

Let us suppose, then, that the silkworm rearers of Asia and Southern Europe have brought into the market cocoons fit for reeling; that the reelers have combined the threads of several cocoons into one, and brought it into the form of hanks; and that these hanks have been imported into England. We shall then be prepared to follow the hanks through the various processes included under the general name of *silk-throwing*, by which they are brought into the proper state for warp and weft threads for the weaver, yarn for the silk-stocking maker, sewing-silk, and

other purposes. Mr. Taylor, the present proprietor of the Lombe Mill at Derby, has kindly permitted us to select that establishment for the object in view.

The circumstance alluded to in the last paragraph, viz., the former prevalence of silk-throwing in Italy, is precisely that which led to the origin of this celebrated mill. Hutton gives a very curious account of the matter, from which we may here condense a few particulars.

The Italians being the silk-throwsters for England, and the taste of the day having set in favour of silks, a Mr. Crotchet of Derby thought it would be a capital speculation to commence silk-throwing in England. He accordingly prepared a small mill at Derby; but, to use Hutton's words, "three engines were found necessary for the whole process: he had but one. An untoward trade is a dreadful sink for money; and an imprudent tradesman is one more dreadful. We often see instances where a fortune would last a man much longer, if he lived upon his capital, than if he sent it into trade. Crotchet soon became insolvent."* It was in the year 1702 that this unsuccessful speculation was set on foot; and a few years thereafter elapsed before the occurrences took place which led to the construction of the present mill, the first one really worked in England.

John Lombe, a good mechanic, a good draughtsman, and a man of tact and energy, went out to Italy with a view of inspecting the machinery employed by the Italians in the process of throwing silk, and of bringing back to England a knowledge of the mode by which the process might be here carried on. As he knew that such an examination would be strictly denied to him, it becomes a very fair question whether such a project was morally or commercially just. We are, of course, well-pleased to see that the silk-manufacture has taken deep root in England: and we are prone to laud the ingenuity of the man who was mainly instrumental in its introduction; but how far such a project deserves to be imitated, when effected by clandestine means, may one day form an item in the ethics of manufactures. However, to proceed. As Lombe could not gain admission to the silk-manufactories by open means, he bribed some of the subordinates, and made frequent secret visits. After each visit he noted down upon paper all the particulars of what he had seen, until by degrees he acquired a general knowledge of the whole routine; but his object being discovered, he fled with the utmost precipitation on board a ship, and narrowly escaped assassination.

On his arrival in England, Lombe determined to fix upon Derby as the scene of his operations; and in the year 1717 he agreed with the Corporation of that town for an island or swamp in the river Derwent, five hundred feet long, and about fifty wide, at a rent of eight pounds per annum. On this spot he erected the mill which is still existing, at an expense of 30,000*l.*; it was built wholly upon huge piles of ash, sixteen or twenty feet long, driven close to each other, and covered with a flooring of masonry to form the foundation of the building. The mode in which he is said to have borne the expense of the gradual erection of this ponderous building was very remarkable. He hired various rooms in Derby, particularly the Town-hall, where he erected temporary engines, worked by hand; and the silk which he manufactured at these engines, though sold at a price which enabled him to compete with the Italian throwsters, yet yielded him so handsome a profit, that he was enabled to advance money by degrees towards the erection of the great mill.

* Knight's Miscellanies: 'Life of William Hutton,' p. 115.

In 1718 Lombe procured a patent for his invention for fourteen years, and carried on his proceedings with vigour, aided by two Italians who accompanied him from Italy. But his death soon ensued under circumstances which Hutton, following the current of popular rumour, thus narrates:—"Alas! he had not pursued this lucrative commerce more than three or four years, when the Italians, who felt the effects from their want of trade, determined his destruction, and hoped that of his works would follow. An artful woman came over in the character of a friend, associated with the parties, and assisted in the business. She attempted to gain both the Italians, and succeeded with one. By these two slow poison was supposed, and perhaps justly, to have been administered to John Lombe, who lingered two or three years in agony, and departed. The Italian ran away to his own country; and madam was interrogated, but nothing transpired, except what strengthened suspicion." The subtilties of "Italian poisoning" have been such a favourite theme for romancers and novelists, that this termination of Lombe's career has been much doubted. There is, however, proof that the Italians were very indignant (and in truth not without justice) at their trade being thus snatched from them; and the King of Sardinia did all he could to prevent the shipment of *raw*-silk from Italy to England; for the raw-silk procured by the English was by them worked up into *thrown*-silk, thereby dispensing with the services of the Italian throwsters.

After the death of John Lombe, the mill became the property of his brother William; but William "being of a melancholy turn, he shot himself," and the property descended to his cousin Thomas, who subsequently became Sir Thomas Lombe. The patent expired in 1732; but Sir Thomas petitioned parliament for a renewal of the patent, on the plea that "the works had taken so long a time in perfecting, and the people in teaching, that there had been none to acquire emolument from the patent." Hutton asserts that Lombe had already accumulated 80,000*l.*, but we know not on what data. Parliament refused to grant a new privilege, but awarded him 14,000*l.* as a reward for his ingenuity; on condition that he would cause an exact model of his machinery to be constructed, and placed in the Tower of London, where it might be open to the inspection of all who sought to erect similar machinery. From that period, a hundred and eleven years ago, silk-throwing became a regular and unrestricted occupation in England.

Such was the origin of the Old Silk-mill at Derby, to which we will forthwith pay a visit. From the market-place a street called Full Street leads in a northerly direction; and out of this street on the right hand branches a narrow lane descending towards the river Derwent. This lane has the appellation of 'Silk-Mill Lane,' one which sufficiently designates its origin and locality. Proceeding down this lane, we see the old red-brick mill before us, speckled around with its four hundred and eighty windows. We have said that the mill stands upon a little island; and to reach this we must cross a bridge which separates the island from the main town. While on the bridge, we can see at a glance that the portion of the river that flows through the narrow channel between the island and the main bank has force enough to turn a mill-wheel: this is, indeed, the portion of the river employed for this purpose; for on looking northward, we see a large wooden wheel which, receiving its motive-power from the descending stream, works some of the machinery within the factory. Until within six or eight years back, the original water-wheel, erected by John Lombe about 1720, continued working in its original position; but it was at length replaced by a new one. We

believe that this "old stager" was not actually destroyed till a year or two ago.

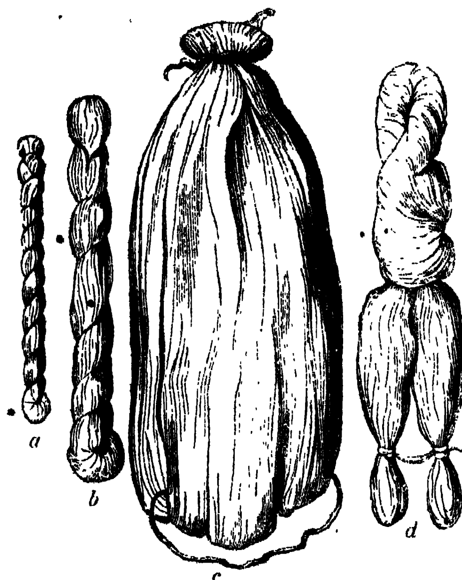
At the eastern extremity of the bridge a pair of iron gates gives entrance to a small court-yard in front of the factory; on entering which it is seen that the mill consists of two piles of buildings, one northward and the other southward of the entrance gates. Each pile is five stories in height; and the two extend to a length of about a furlong, bounded on all sides by the river Derwent.

The floors or ranges of each pile are of great length, and lighted on both sides by windows. Generally speaking, one floor is devoted to some one particular department of the silk manufacture, and is fitted up with machines pertaining to that branch. In a kind of warehouse near the entrance is a curious memento of John Lombe, which has probably occupied its present position undisturbed for more than a century. It is an old box or trunk, six or seven feet long, and between two and three wide and deep. It is made of a very hard kind of wood, and is carved all over with curious devices. We have been informed that it still contains numerous documents, once probably belonging to the Lombe family, but the nature of which is not at present known. Indeed the intermediate history of the factory, from Lombe's time, till the present proprietor came into possession of it, is not very clearly to be traced.

In some of the floors, the machines employed are such as little girls can attend to; in others, elder girls or women are necessary; in some, boys and men form the principal workpeople; but in all silk-mills the larger number of those employed are females. In the rooms where girls and women are engaged, a song is not an unfrequent accompaniment to the clack, and thump, and humming of the machinery. We do not know in what department of the silk-throwing processes William Hutton, when a boy, was employed; but he tells us in his Autobiography, that he went to the Lombe mill in 1730, when about seven years of age. He says that, when his parents thought he ought to begin to work for himself, "the silk-mill was proposed. One of the clerks remarked to the person who took me there, that the offer was needless, I was too young. However, the offer was made; and as hands were wanted in the infant state of this work, I was accepted. It was found, upon trial, that nature had not given me length sufficient to reach the engine; for, out of three hundred persons employed at the mill, I was by far the least, and the youngest. It is happy for man that his invention supplies the place of want. The superintendents wisely thought if they lengthened one end it would affect both. A pair of high *pattens* were therefore fabricated, and tied fast about my feet, to make them steady companions. They were clumsy companions, which I dragged about one year, and with pleasure delivered up."

The best way for us to see how the various floors of the building are occupied with machinery, and what is the nature of the processes at which the workpeople are engaged, is to trace a hank of silk through the various processes, till it assumes the form of yarn or hosiery silk, warp and weft, or sewing-silk. And it may be well here to remark, that we have selected the old Derby mill for illustration, not for the modern character of the machinery fitted up there, but for the associations which bind it so indissolubly with the history of the silk manufacture in England. Modern improvement has wrought many changes in the mode by which machinery has been brought to bear on the manufacture; but the general principle, so far as the effect to be produced, is alike in all; and a general reader will understand the process better, the less refined and complex is the machinery employed.

First, then, we have to understand that the hanks of raw yellow silk are brought to the factory in bales or bundles. The appearance of these bales, when opened, is remarkably beautiful, from the glossy richness of the material. The silk has different tints of colour, and different delicacy of texture, according to the country whence it has been brought. For instance, the Broussa silk and the Chinese silk are whiter than most of the other kinds. The bales of Bengal silk are made up to a weight of about a hundred and fifty pounds, and consist of hanks or 'heads' of small size. The Italian silk is made up into rather larger bales, and consists of larger hanks. The Persian silk, which is of inferior quality, is in still larger hanks, weighing about a pound each. The various qualities of raw silk are now purchased in the market at from ten to twenty shillings per pound. The annexed cut will show the general form of the hanks.



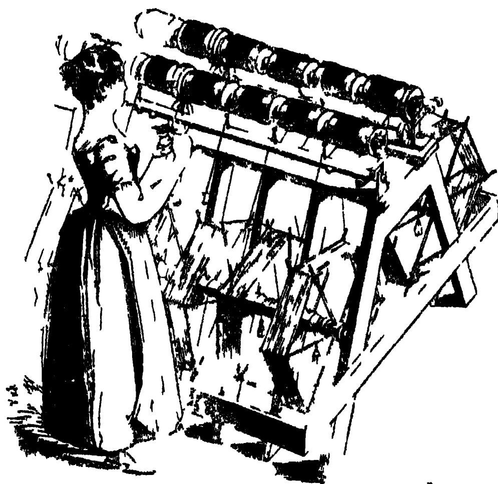
[Hanks of Silk.]
a, Bengal; *b*, Italian; *c*, Persian; *d*, Broussa.

The processes which these different kinds of silk undergo, in their passage through the silk-mill, depend on the purposes to which the silk is to be applied. Thus, there is a kind called *dumb singles*, which consists of silk merely wound and cleaned: this is used in the weaving of gauze and other thin fabrics. Another manufactured variety, called *thrown singles*, is silk which has been wound, cleaned, and thrown, and is then used in the weaving of ribbons and common silks. *Tram* is silk which, besides being wound, cleaned, and thrown, is 'doubled,' that is, two or more thicknesses of thread are combined into one, and twisted together; this is used for the weft or cross threads of Gros de Naples, velvets, flowered silks, and the best varieties of silk goods. Another kind, called *organzine*, besides being wound, cleaned, and doubled, is twisted or thrown twice; the first twist being like the yarns which form a strand, and the second like the strands which form a rope: this forms a hard and compact thread, and is used as the warp or long threads for the same kind of goods as those which have *tram* in the weft. Lastly, *sewings* are compound threads of silk, wound, cleaned, doubled, and thrown, with especial reference to their ultimate use as sewing-silk.

It will thus be seen that the operations to which the silk is submitted differ in complexity, according to the purposes to which it is to be applied. Some are only wound and cleaned; others wound, cleaned, and

twisted once; others wound, cleaned, doubled, and twisted once; others wound, cleaned, twisted, doubled, and twisted again. In point of fact, therefore, the main operations may be classified as *winding*, *cleaning*, *doubling*, and *twisting* or *throwing*, with a few others subordinate to them.

After a slight washing or soaking comes the process in which the *winding-engine* sketched in the accompanying cut is brought into requisition. The winding-room at the silk-mill is a busy, bustling place, filled with machines, the construction and arrangement of which may be thus briefly described. Across the width of the room, from side to side, extend the machines in parallel rows, leaving a clear passage on either side of the room. The machines are sufficiently far apart to allow the workwomen and girls to pass between them; and these females we see walking to and fro, adjusting the different parts of the apparatus, removing bobbins when they are filled with silk, replacing them with other bobbins to be similarly filled, and providing a supply of the material which is to be wound.



[Winding-Machine.]

The term 'winding,' as here applied, refers to the original skeins or hanks of silk which are to be wound on bobbins four or five inches in length before the silk can go through the processes of manufacture. Any one who has sat at a domestic fireside, and has seen the process of winding a skein of silk on a small wooden reel or round a roll of paper, will be prepared in some degree to understand how the winding in a silk mill is effected, so far as the change of form in the silk is concerned. It will be recollected that we explained, in a former paragraph, how the silk-reelers of Italy transfer the silk to a hollow framework or reel, as they draw it from the cocoons; and it will be obvious that the circumference of the framework will determine the size of the skein or hank produced. Then, in order to wind from the hank, the latter must be stretched out over a support of some kind or other; a lady employs her sister or friend—or perhaps her lover—to hold a skein of silk stretched between the two hands during the process of winding; but the manufacturer employs a dumb agent to perform a similar service.

Understanding this, then, we may say that this dumb agent in the winding machine is called a *swift*—somewhat unfittingly, perhaps, for its movements are very slow compared with those of the bobbins. It is a hexagonal frame, or, if we may use such a term, a six-sided hoop, whose circumference equals the circumference of the skeins of raw silk. The skeins or hanks, as imported from different countries, are not always the same size; and therefore 'swifts' of different diameters are provided. The swifts are also made in a light and elastic manner, so as to adapt themselves readily to small differences of dimensions. The hanks of silk are opened and separated, and the skeins spread on the circumference of these swifts. These swifts are ranged in parallel rows of several dozen each, on either side of every winding engine, so that a common axle, running through the centres of them all, will permit them all to rotate.

Next, for the bobbins to which the silk is to be transferred. These are ranged in a row above the swifts, one bobbin to each swift; and all the bobbins revolve together on a horizontal axis. Now when one end of the thread of any given skein is carried up from the swift to the bobbin above, and attached to it, the rotation of the bobbin will cause all the silk to be gradually unwound from the swift on to the bobbin. The swift rotates solely by the pulling-force of the silken thread, as the latter becomes wound up; and this rotation causes the silk to be freely given off from the swift. If no further provision were made than is here indicated, the silk would be wound in an irregular heap on the bobbin; but it is made to distribute itself in a parallel and equable layer, by passing through an eye before it reaches the bobbin; which eye is fixed in a bar that oscillates or traverses to and fro sideways, so as to bring the thread successively in front of every different part of the length of the bobbin.

The silk, then, has been, we will suppose, wound upon bobbins, and is ready for the subsequent operations. That which is termed '*cleaning*' is simply the removal of all impurities or irregularities by which the diameter of the thread may be rendered unequal. Sometimes this is effected in the same machine by which other parts of the process are carried on; while in other factories a separate machine, called the 'cleaning machine,' is employed. However, the principle is the same in both cases, and consists merely in passing the silken thread through a cleft in a piece of steel, so adjusted in size as to allow the thread, in its proper state of thickness, to pass freely through, but to detain and remove all asperities, roughnesses, and irregularities of surface.

If the preceding details be borne in mind, it will be understood that the next process will depend on the purpose to which the silk is to be applied; whether the thread is to be used as 'dumb singles,' thrown singles, tram, 'organzine,' or sewings. But it will suffice if we deem the 'twisting' or 'throwing' to be the next process, as it is indeed in most cases.

There does not seem to be any very definite distinction, among silk-throwsters, between the terms *spinning*, *twisting*, and *throwing*; or at least the difference existing is not such as can be understood by general readers. All these terms refer to the formation of a rope-like twist of the silken filaments for the purpose of strength. In the 'filatures,' or reeling houses in Italy, where the threads of many cocoons are united into one compound thread, this thread coheres merely by the glutinous gum which envelopes the threads, and not by an actual *twisting* of the threads: this twisting is reserved till the silk reaches the throwing-mill.

We follow the silk, therefore, to the throwing or twisting room, where machines called 'spinning machines' (represented in p. 166) are at work. This is an inconvenient confusion of terms, for spinning is properly the combination of a number of *short* fibres into a continuous thread, such as takes place in the cotton, woollen, and linen manufactures, and also in the silk spinning from waste silk. In a silk-throwing mill the term spinning ought not in strictness to be admitted at all,



[Spinning Machine or Engine.]

since there are no short fibres to be combined into a continuous thread. Be it a 'twisting' or a 'spinning machine,' however, the action is both simple and beautiful. The floor or story in which these machines are congregated exhibits them ranged one behind another in two rows, and the eye is at once struck with the thousands of little spindles and bobbins which are whirling round at a very rapid rate, some yielding the silk which is to be twisted before reaching the others.

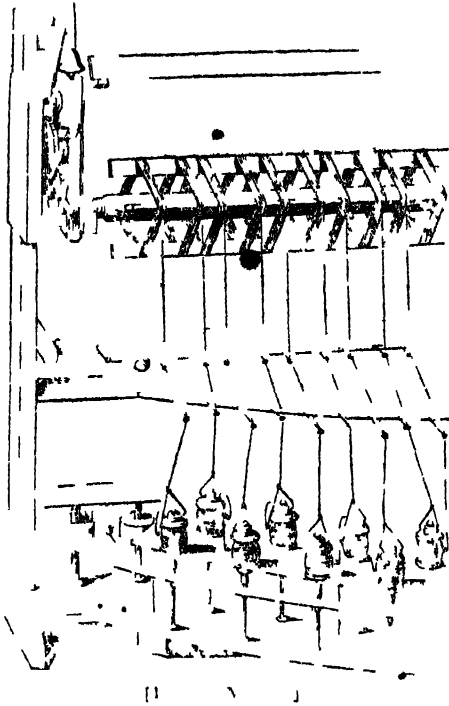
There is, to every machine, a set of bobbins whose axes are horizontal, and another set whose axes are vertical, and the twisting takes place while the silken thread is passing from the former to the latter. The vertical bobbins do not revolve, but they are placed upon steel spindles which pass through their centres; and these spindles, together with a kind of loop or eye attached to one end, revolve rapidly. The silken thread being passed from the horizontal bobbin through the eye or loop, and fastened to the stationary vertical bobbin, and motion being given to the apparatus, the thread becomes wound on the vertical bobbin by the rotation of the little loop apparatus, called the 'flyer,' round this bobbin, and a twist is at the same time imparted to the thread.

We have said nothing of the comparative velocity with which the two parts of the apparatus revolve, but it will be seen that a change in this relation produces a curious effect. If, while the bobbin maintains a uniform rate of movement, the flyer rotates more rapidly, the *hardness of twist* is increased, or there are more spiral turns in a given length of thread. If, on the other hand, the velocity of the flyer decreases while that of the bobbin remains uniform, or that of the flyer remains uniform while that of the bobbin increases, the twist becomes slackened, or there are fewer turns in a given length. The silk-throwster can therefore give any degree of hardness or closeness to the twist, by varying the relative velocities of the two moving parts.

However complex the twisting-machine may seem at first sight, it is but a repetition of similar parts, each of which acts in the manner just noticed. All the horizontal bobbins are made to rotate by one piece of mechanism, while all the spindles owe their motion to another. The foreman or superintendent of the department regulates the relative velocities which the two movements shall bear to each other, according to the hardness of the twist to be given to the thread; but, when this is adjusted, women and girls attend the machines, replacing the lower bobbins when emptied, and the upper ones when filled, and also joining the ends of broken threads.

We may now dismiss the twisting of the single threads, and speak of the *doubling* which takes place in the manufacture of tram, organzine, and sewing silk. This is a combination of two or more threads into one, to increase the strength and thickness, and may be deemed analogous to the combination of the threads from many cocoons into one in the foreign reeling-houses. The number thus combined varies generally from three to twelve; and it is a mere combination or laying together, without twisting. This is effected in two different ways, either by a kind of hand-wheel, something like a spinning-wheel, or by an automatic machine of greater complexity; but it will be more readily understood if we speak of the hand method only. In one of the rooms of the factory are a large number of women, each sitting on a low stool, and having before her a small wheel which she turns with the right hand. Each woman has, fixed up in a small frame near her, as many bobbins as there are to be threads doubled together. From each of these bobbins she takes the loose end of silk, and combining them all into one, passes them through a kind of loop, and thence attaches them to her wheel. Then turning the wheel with the right hand, she unwinds all the thread from all the bobbins, and obtains a doubled but untwisted thread therefrom. It generally happens that while some of the women are doubling two threads together, others are doubling three, others four, and so on, to suit different qualities of goods. The women arrange their simple machines [illegible] one behind another for economy of space, having the bobbins of single silk placed on upright spindles on which they can rotate with facility. Our frontispiece was sketched in this 'doubling-room.'

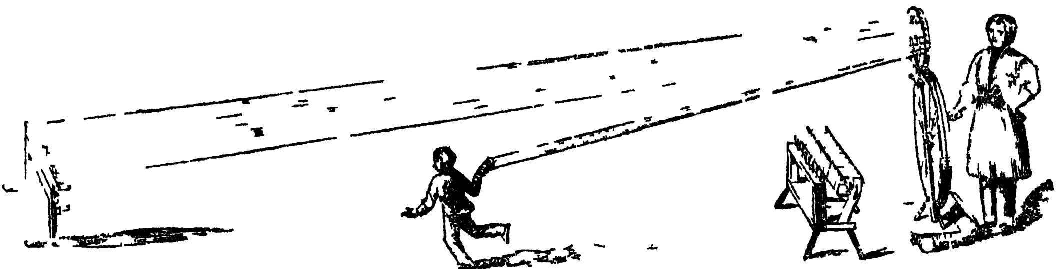
The doubled threads, whatever be their number, are, as we before observed, merely laid side by side in a parallel group, without any intimate combination. The combination is the result of the next process, called *throwing*, by which the two, three, five, or a dozen threads are twisted firmly one around another. The 'throwing-machine' here represented for twisting doubled threads, is almost exactly the same in principle as the 'spinning-machine' for twisting single silk, though differing in some of the details. In both cases the thread to be twisted is wound on a horizontal bobbin or reel, while the bobbin for receiving it is in a vertical position. In both cases the twist is given by a 'flyer' revolving rapidly round the vertical bobbin and carrying with it the thread through an eye or loop. In both cases the hardness or closeness of the twist is regulated by the ratio between the velocities of the two parts of the apparatus. But in the one case a single thread is twisted around itself, while in the other several are twisted round one another, like the yarns in a rope; or rather, if we may compare the elementary cocoon filaments of the silk with the elementary hempen fibres of a rope, we may say that, in the first stage the filaments are combined and twisted into 'singles,' while the hempen fibres are combined



and twisted into yarns; and then, in the second stage, these yarns are combined and twisted into 'warp threads,' while these yarns are combined and twisted into strands or ropes. We say the analogy between ropes and thrown silk is very close, and may be understood accurately. We find that while the fibres of a yarn are twisted in one direction, the yarns of a rope are twisted in the opposite direction; and the like is observed in the twisting of silk, so far as regards organzine, sewing silk, and other kinds in which strength is required. The matter may be thus expressed:—For 'singles,' after the raw silk has been wound, it is thrown or twisted *to the right*; for 'tram,' the silk is not twisted immediately after being wound, but the raw silks are doubled, and then twisted *to the right*; for 'organzine,' the raw silk, after being wound, is twisted *to the left*, then doubled, and the doubled thread finally twisted *to the right*. This rope-like texture gives great firmness to the organzine, while the lesser amount of twisting in the tram gives it a more floss-like texture, better suited to some purposes than the organzine.

There is, in some parts of the processes now described, a very pretty little contrivance, which has often been noticed as one example among many which our manufactures afford, of certainty and precision in mechanical operations. It is a piece of mechanism which refuses to work when anything is going wrong: it is a tell-tale, an announcer, a warning, which immediately informs the workwoman that something requires her attention. When the delicate threads of silk are passing from one revolving bobbin to another, if the thread happens to be defective at any particular part, it is likely to break; and in many cases a breakage would seriously injure the manufactured article, if not immediately attended to. For instance, if four threads are being doubled into one, and one of the four break, the other three, if not instantly stopped, would continue to form a threefold thread, which would not correspond with the fourfold previously made. The contrivance acts by stopping all the bobbins of one group instantly, when any one of the threads break. Each thread passes through an eye in the end of a short lever, and when a thread breaks, the lever loses a temporary support, drops, and by means of a sort of catch or detent stops the movement of the bobbin on which the doubled thread is being wound. The stoppage of the movement instantly attracts the notice of the attendant, who mends the broken thread, and puts the apparatus again into motion.

There are some kinds of twisted silk more dense, thick, and strong than the ordinary varieties, which are prepared by hand-twisting in a mode that cannot fail to strike the attention of a visitor, and which, to one unaccustomed to the inspection of machinery, exhibits the true nature of the twist in a clearer manner. In one of the long rooms or ranges of the mill a number of young active boys are seen running to and fro with untiring industry, carrying or supporting silken threads in their hands: these boys are assisting to form twisted silk much on the same principle as twine is spun in a rope-walk. At one end of the room is a large wheel turned by a handle. On one face of the



[Throwing or spinning by hand.]

wheel, near the circumference, are about a dozen hooks ranged in a circle. Several threads of silk, twelve or a lesser number, are fastened to these hooks, and the other ends of the whole twelve are carried to the distant end of the room by the boys. At that end they are fastened to hooks attached to a machine capable of travelling slowly along the floor. Matters being thus prepared, the handle of the wheel is set in motion, by which the hooks are made to rotate with great rapidity, and the threads fastened on them become thereby twisted one around another with great closeness. It bears in fact a very close resemblance—not so much to the spinning of yarn from hempen fibres—as to the twisting of strands or cords from yarns in a rope-yard. The silk-twisting is, however, effected with great quickness, and the little boys are incessantly engaged running to and fro, attaching and detaching the remote ends of the silken threads. We were informed that this running amounts sometimes to as much as thirty miles a day, and forms a striking

contrast to the stillness and fixedness of many departments of factory labour. All the boys at one frame or wheel are under the control or orders of the man who superintends the wheel, and who is responsible for the work produced.

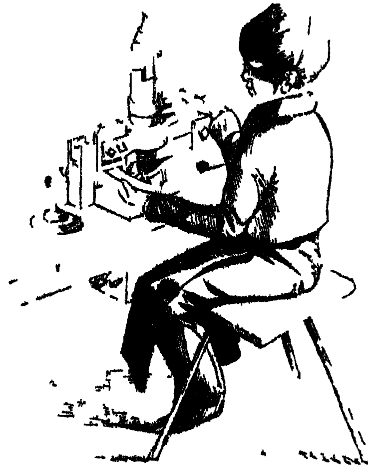
All silk is either dyed or bleached at some stage or other of its progress, and this is generally effected, we believe, immediately or soon after the twisting is finished. But before it is dyed, it is made up into convenient hanks, and 'scoured,' to remove the gum which may still adhere to the silken filaments. Before this scouring the silk is harsh to the touch, and is unfit to receive the dye. It is boiled for three or four hours in strong soap and water, by which the gum is dissolved, and the silk rendered soft and glossy. This scouring, together with the waste which occurs in the preceding departments of the manufacture, reduces the weight of the silk four or five ounces in the pound. The silk is washed in a current of clear water to remove the soap, and it is then seen that, although the weight is so much reduced, its bulk is greater than before, and it presents the soft, rich, and delicate gloss which is the characteristic of silk.

The processes of silk-throwing, or 'throwsting,' considered as a general whole, may now be said to be finished, and the silk-throwster has nothing further to do with the material: he supplies the silk in this state to those who wish to use it as warp and weft for weaving, as yarn or thread for hosiery and gloves, as sewing-silk, or to any of the numerous purposes to which thrown silk is applied.

We have said that the Old Mill at Derby exhibits processes arising out of, but not exactly pertaining to the occupation of silk-throwing; that is, some of the thrown silk is there manufactured into finished articles. To this extent, therefore, it is something besides a throwing mill; but these additional features we can notice only in a very brief manner.

In some rooms, by a kind of workmanship intermediate between, or a sort of combination of weaving and twisting, there are various descriptions of silk cords, laces, and lines manufactured. The rage for cheapness in the present day has led to a curious exercise of ingenuity in this department of manufacture by the invention of a process termed 'plating,' which bears the same relation to the real silk manufacture as metal 'plating' does to manufactures in silver. It consists in putting a coating of silk on a substratum or foundation of cotton, by which the more costly material is only used in those parts which meet the eye. The history of our textile manufactures within the last dozen years is full of examples of this kind in which the manufacturer endeavours by economizing the more costly materials, to bring his wares within the purchasing capacity of an increased range of customers. The inventive ingenuity called for in these adaptations is often exceedingly great, and it has occasionally happened that new productions which have owed their origin to motives of this kind have created a new market by their beauty as well as their cheapness.

One very remarkable article of manufacture—remarkable, at least, in respect to one department—produced at this establishment is that of silk boot-laces with brass *tags*. The laces themselves are made by a kind of braiding or twisting process, in some degree analogous to that of whip-making. The *tags* which form the rigid end to each lace are made by two small machines, placed upon low benches, and worked by boys. In the first of these machines, here sketched, a boy takes in his hand a strip of brass, whose width equals the intended length of the tag, and, placing this in a kind of groove, he brings down a cutting-edge to act upon it, which cuts the brass to the required size. The groove in which the brass is placed is at the same time



[Machine for cutting and hollowing the tags.]

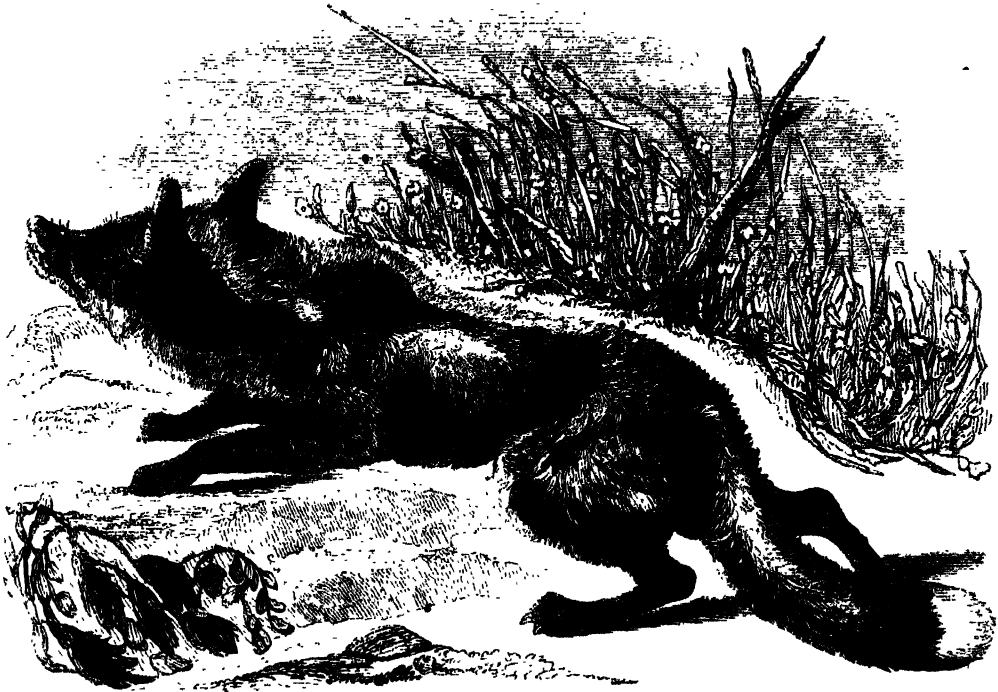
so formed, that the little piece of brass as it is cut off is at the same time bent into an angular or concave shape. The pieces of brass thus prepared are then carried to another bench, where other boys are working a machine which fixes the tags to the laces. The tags



[Machine for fixing tags to the laces.]

are dropped one by one into a little recess, and the end of a lace being laid in the hollow of the tag, a lever is brought down with the left hand, by which the tag is made to embrace the lace firmly, enclosing it all round. This is done with astonishing rapidity, and forms a curious instance of the dexterity which is acquired by long practice. No less dexterous is the way in which a hole or two are made in each tag, to pin it more effectually to the lace.

We may remark, in conclusion, that the floss silk forming the outer covering of the cocoons, the defective cocoons, and the waste produced in the filature and throwing of good silk, are the materials which are sent to the silk-spinning mills to be manufactured into yarn for shawls, bandana handkerchiefs and other coarse articles made of 'spun silk' by a process nearly resembling cotton-spinning. This department of the silk-manufacture has extended in a remarkable degree within the last few years.



[The Fox.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

THE FOX.

Time was when the bear and wolf, the wild boar and wild bull tenanted the forests and hills of "merrie England;" and the painted Briton, the Roman, the Saxon, and the Norman—each in their turn—entered with ardour into a chase exciting from its danger, requiring strength of arm and firmness of heart, and in which abundant opportunities offered for the display of courage and address. Now we may wander through wood and glen—over the heathy hill or wild moorland—the very spots in which these "beastes of venery" once lived, and "where they were, there they are not." The surly bear no longer makes the hollow tree of "bald antiquity," or the rift in the rock, his dwelling; the howl of the wolf wakes no longer the echoes of the night. We fear not in the wood to come suddenly upon the lair of the boar, or meet him, with fiery eye and mane erect, ready to rush forth; nor will the lowering wild bull with awful front bar our passage. They have all disappeared before the march of civilization; man has encroached upon their ancient territories, utterly extirpated them, driven the plough over their haunts, and depastured his flocks and herds in their fastnesses; nor does the peasant, as driving his team he whistles in security, dream that perhaps where he stands many a fierce contest may have taken place between the savage beast of the forest and the mighty hunter of other days. So changed, indeed, is the face of our island since the days of Caractacus, that the warrior, were he to revisit his own kingdom, would think himself in a foreign land. It is thus by man's agency on the surface itself of the earth—by clearing forests, draining morasses, banking up rivers, introducing vegetable productions alien to the soil—that he influences the condition of the wild occupants of the land; his operations, independently of bow, or spear, or gun, tending to the gradual extinction of some, the numerical reduction of others, and, *per contra*, to the naturalization of not a few. We here open a subject of the highest interest—man's agency on the earth as affecting the animal and vegetable kingdoms; and we would suggest to our reader to ponder it a little in his mind.

It is the fierce, the destructive, and the dangerous, that man first expels or extirpates; the less powerful and ferocious, though thinned, linger to a more distant date: but then sometimes a kind of reaction takes place, and man is perhaps anxious to preserve certain wild animals, in order that they may contribute to his pleasure. Hence laws, often arbitrary and severe in the extreme, are enacted, in order that the privileged few may enjoy the pleasure alone. These laws may indeed become ameliorated; but, while they continue, they operate as a check to the extirpation of certain species, which, but for such a preventive, would speedily take place. In this predicament stands the Fox, an animal which, although not strictly game, would, if not protected, soon follow the fate of the bear and the wolf, and become extinct within the limits of our island. The wild-cat, the otter, the badger, the polecat, marten, stoat, and weasel (setting aside three or four species of seal), are, in addition to the fox, the only carnivora now existing in Great Britain; and of these the three first, and especially the wild-cat and otter, are very scarce, excepting in certain localities which favour their concealment or afford them security. The fox is much more widely spread, and, in some districts, as the farmers have reason to know, is very common, and in the grey of the morning may be seen skulking away from the scene of his nightly depredations. In all ages the fox has been celebrated for its wiles and cunning, and in a country like our own, where it has more than ordinary occasion for the exercise of craft and watchfulness, it becomes doubly suspicious. Hence the most tempting bait will scarcely

ever induce it to enter a trap. The disposition of the fox is portrayed in the expression of its physiognomy. The sharp ears and muzzle, the oblique eye with a linear pupil, and the peculiar curl of the upper lip, displaying the canine teeth, and especially observable when the animal is excited and ready to snap, proclaim a mixture of craftiness, vigilance, and fierceness.

When prowling in the dusk, or watching for rabbits along the borders of the coppice, it proceeds with its limbs bent in a crouching attitude, with ears erect and gleaming eyes, intent upon its prey, and at the same time quick to take the slightest alarm and dart off to the place of its concealment. The figure at the head of this article is an admirable delineation of the fox on his twilight prowl, stealthily creeping upon his victim, yet alive to his own danger. Though the fox is nocturnal in his habits, he is not exclusively so; it is not often, however, that he ventures abroad during the day. We have ourselves once or twice seen a fox by the edge of a wood in full day; and, during a recent visit to Essex, two foxes were observed in the afternoon in a bean-field, near a farm-yard, the scene of many of their exploits. In the same farm-yard, a few weeks previously, the shepherd's dog (a powerful animal) surprised and seized a fox in the morning, who defended himself with the utmost determination, when one of the men coming to the dog's assistance (which was not needed), in endeavouring to strike the fox with a stick, struck the dog, upon which the latter let go his hold, and allowed the fox to escape.

Innumerable are the stratagems which the fox employs in the acquisition of his prey. He reconnoitres the precincts of the farm-yard, and acquaints himself with its topography, and the arrangement of the sheds and buildings; neither a high wall nor palings obstruct him; he leaps over the one, or creeps under the other, glides noiselessly to the poultry-house, and seizes his victim, often without disturbing the rest of the feathered sleepers; generally, however, he is not content with one, but puts most or all to death, for he has not only to gratify his instant appetite, but to provide against a future day. Domestic poultry, ducks, or geese, are equally acceptable. In this habit of providing for future contingencies, the fox resembles the dog, which we know buries the bones he does not want at the time, returning to them when his inclination tempts him. Thus the fox having made havoc among ducks or fowls, if time permits, carries them off, and hides them in the earth, not in a single place, but in many places, so that if one of his hoards be discovered by a brother robber, he has other resources to apply too. Dr. Weissenborn assures us, that "a few years ago a fox entered in broad daylight the poultry-yard of the parsonage of Sentzke, in Westhavelland, and succeeded in killing twenty fowls, and burying nineteen in the neighbouring garden. When the animal was entering the garden with the twentieth, it was observed, and took to its heels. On account of its burrow being distant, it had availed itself of so favourable an opportunity of laying in a store near the yard, which for several days and nights running it tried to bring away to a safer place, until it was caught in one of the traps set for it." To this he adds, "I can testify that a fox will even in winter save half a hare towards the night to come. In my youth, one morning after a night during which there had been a moderate fall of snow, I hit upon the track of an old hare accompanied by that of a fox. I followed them into the open field about an English mile, when I came to the spot where the hare had been killed and partly devoured; but observing in the continuation of the fox's track that something had been dragged, I had the curiosity to follow it farther, and at the distance of a few hundred paces found the posterior half of the hare in an excellent condition, buried in the snow under a little bush. I confess the hare was so well carved, that I had no objection to partaking of Mr. Reynard's fare, preferring at dinner—

> 'No doubt,
> A rogue with venison, to a saint without.'"

Rabbits, pheasants, and partridges are in some places destroyed in great numbers by the fox; the former indeed are especial favourites as food, and in surprising them the subtle animal displays the most consummate address; besides these, in times of scarcity, field-mice, frogs, and even weasels and polecats, are seized and devoured. Dr. Weissenborn, however, asserts that even the severest hunger cannot compel it to eat the flesh of birds of prey.

Besides animal diet, the fox will feed upon sweet berries, and exhibits a great predilection for grapes: in our island these dainties are not within its reach, but on the Continent it visits the vineyard when the fruit is ripe, and commits considerable mischief. The sweetness of the fruit is no doubt grateful to the animal's palate, and it may be observed that the dog soon becomes very fond of sugar. This partiality for sweets leads the fox occasionally to plunder the bee-hive, as it is asserted, notwithstanding the stings of the enraged inhabitants of the overturned temple of honey-stored cells, from whose annoyance he rids himself by rolling upon the ground, and ultimately secures his prize. For ourselves, we never knew any instance of this kind, though many of the devastation of poultry-yards adjoining to gardens in which were rows of bee-hives. We do not deny, however, that instances of this animal plundering the hive may have happened. The kinkajou of South America, the ratel of Africa, and other animals, plunder the nests of the wild bee.

The fox dwells in a solitary burrow, which he excavates in a secluded place, generally on the edge of a forest, or copse, and always in a situation abounding with his favourite food. In his selection of a proper spot he is much influenced by the nature of the country; forming his domicile, according to circumstances, in the neighbourhood of a warren, a preserve of game, or a farmyard, especially where tangled brushwood and rough and broken ground favour its concealment. In this burrow, which in the sportsman's language is called its 'earth,' it usually remains concealed during the day. It is not always that the fox digs his own retreat, he not unfrequently appropriates to himself the burrow of the badger, or even that of the rabbit, which he easily enlarges sufficiently for his convenience. Sometimes the fox dwells unsuspected in the very centre of the area of his depredations, and where no one would think of looking for him. We know of an instance in which the burrow of a fox, which had sadly thinned the stock of poultry, was by accident found in a part of the garden appropriated for pea-sticks and various sorts of garden rubbish.

* Mr. Daniel ('Rural Sports') defends the fox from the accusation of killing lambs, urged against it by the farmer. Mr. Bell, on the contrary, says, "it has been known not unfrequently to carry off a young lamb." We should certainly say from our own experience that young lambs are very frequently the prey of this sanguinary animal, and that his title of "robber of the fold" is by no means misapplied. More than once have we heard the farmer's lamentations and vows of vengeance on discovering the palpable proofs of the caitiff's depredation. In Germany, as Dr. Weissenborn assures us, the fox destroys the roe and even the young of the red-deer. In the forests during the winter the fox, he observes, "fares most abundantly when the snow is from one and a half to two feet deep, and a hard frost succeeding a short thaw has produced an icy crust suf-

ficiently firm to carry the fox, but not the roe." Not only is the swiftness of the former then comparatively much greater, but the roe or young red-deer to which it gives chase soon bleeds at the shins, and falls an easy prey to its pursuer.

The female, upon whom devolves the entire labour of rearing her cubs, breeds in April. She produces from five to eight at a birth, preparing for them a nest at the bottom of her burrow, lining it with dry leaves, moss, and hay. At this period her maternal solicitude is strongly manifested: she employs every artifice to conceal her offspring from discovery, and defends them with indomitable courage; and if she suspect her retreat be discovered, she carries them away one by one to a place of greater safety. A female fox has been known to carry a cub in her mouth during a severe chase of nearly an hour, and only drop it at last from the absolute impossibility of longer retaining her hold compatibly with the freedom of breathing, so necessary in her harassing situation. Mr. Daniel ('Rural Sports') has recorded a curious instance in which the female fox departed from her ordinary habits, in order to the more perfect security of her young. In April, 1784, a terrier belonging to the narrator of the circumstance scented a fox to the bottom of a pollard-tree, then up the tree, which the dog vainly made repeated efforts to ascend, till at length the whipper-in, climbing the tree, lifted the dog before him; there in a hole twenty feet from the ground was the fox, with four cubs which had been littered there for safety, and to this hiding-place she must have ascended by the assistance of the roughness of the bark and the boughs alone.

The young ones, or cubs, of the fox are very playful, and, as we have seen puppies do, are fond of endeavouring to catch their own tails, turning round and round in the effort: at about the age of four months they leave the female's protection and shift for themselves. When captured, even at the earliest age, and brought up in confinement, with every kindness, the fox still retains its suspicious character: it may perhaps display some degree of familiarity towards the person who has attended to it, and supplied it with food, but it manifests nothing of the gratitude and attachment of the dog, and on the approach of strangers will almost always conceal itself, or, should they attempt to touch it, repel their advances with a bite. To attempt to tame a full-grown fox is useless: it exhibits the utmost impatience of restraint—tries by every means to regain its freedom, and if it cannot succeed, pines, becomes spiritless and dejected, and soon dies. It is essentially an animal "feræ naturæ," to which liberty is dearer than life or limb.

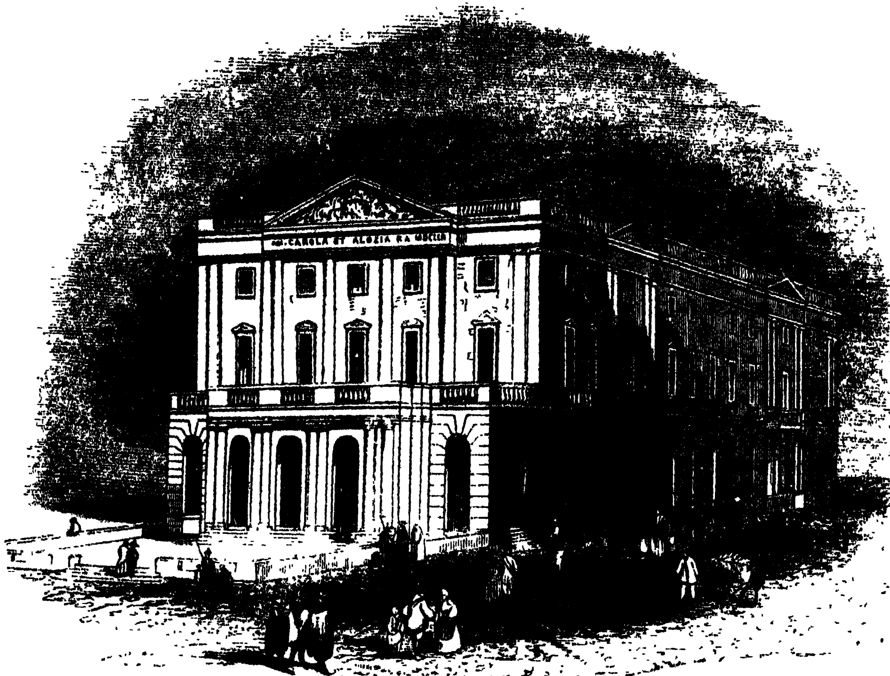
Indeed there are instances well authenticated of foxes caught by the leg in a trap freeing themselves by biting off the confined and perhaps broken member. Dr. Weissenborn cites a case in which a person whom he knew broke one of the fore-legs of a fox with a rifle bullet, when the animal, being hampered and annoyed by the leg dangling about, turned angrily round and bit it off. He relates other instances, which we will not quote, proving the creature's indomitable resolution and endurance of pain. Mr. Bell adduces the following interesting fact from a correspondent, which shows that when deprived of a limb, the fox, as if conscious of his condition, departs from his usual method of seeking safety by flight before the hounds. "I remember once, when out hunting, the hounds found a fox, who did not leave the cover, but kept running from one part of it to another. Just as a hound was about to seize him he jumped over the dog, and thus saved himself. This tedious sport was kept up for a long time, till Reynard, being thoroughly tired with so many leaps and so many enemies, at last fell a prey to them. The huntsman on taking him up found that he had lost one of his fore-legs. The cover being entirely of furze, and not large, I could see all sides of him during the hunt, and was much pleased with the many elegant and quick leaps which the poor three-legged fox made to save himself from destruction."

The voice of the fox is a sort of yelp, which, however, it never exerts when watching the movements of its prey, or creeping into the preserve or farmyard. Bewick unhesitatingly asserts from his own observations that the dog and fox will breed together, notwithstanding Buffon's negative. Mr. Bell, who admits that the belief is general, observes that he has in vain endeavoured to trace any valid ground for it. We have often seen sharp-nosed dogs which were called fox-dogs, and have been at the same time assured that they were a cross between the two animals: but on a close investigation we always found that important links in the chain of evidence were wanting; and we have reason to believe that Bewick has based his assertion on nothing more than common hearsay.

It would seem that the fox becomes attached to his old haunt, and that if caught and removed from it even to a great distance, he has, like the dog, the faculty of tracing the road home. During the time, says Mr. Daniel, that the old Duke of Grafton kept his hounds at Croydon, his Grace's pack were occasionally supplied with foxes from Whittlebury forest: they were sent in the first instance to London, in the venison-cart, and thence were conveyed the next morning to Croydon in a hamper behind the duke's carriage, when they were immediately turned out before the hounds. A stout fox, conveyed in this manner, was hunted and escaped. Some time afterwards the huntsman suspected that the same animal had been a second time sent from Whittlebury; and to verify the fact, if it happened again, he had him marked previously to his being chased: he escaped. A third time was he taken in his old haunts, and at length fell a victim to the hounds.

[To be continued.]

The Mimulus.—The musk-plant, which is so familiar to almost everybody, is a species of Mimulus, or Monkey-flower; but the gardens have been greatly enriched of late years with a Mimulus which is raised from seed, in almost endless variety, and whose flowers are very large. We have also a Mimulus of a bright red colour, called Mimulus Cardinalis—and between the former, with large yellow flowers, variously spotted with brown or purple, and the Cardinalis, there are many hybrid varieties. The form of the flower is odd, something like a bell, with divisions, and the edges, as far as they are divided, turned over; these lappets, and the inside of the flower also, are strangely blotched and spotted with brown or red, or reddish purple on a cream-colour or yellow ground; and when planted in a moist situation, it will grow and bloom from spring to winter. It is exceedingly fond of water, and is one of the very best plants that can be placed round the moist edge of a pond or tank. It strikes root at every joint, and will grow even swimming on the surface of water. So rapidly does it strike root, and so numerous are the joints, that if a plant were cut into pieces, and sown as seed, there would be numerous young plants come up even from joints which had not a quarter of an inch of stem. When it was first introduced, great pains were taken with it for its novelty; but its rapid and weedlike growth prevented it from being long estimated, although there can hardly be conceived a more brilliant subject for clumps in the geometrical or Dutch gardens. Small bits, planted six inches apart, and constantly watered, will soon cover the bed; and they will require nothing more than watering, keeping clear from weeds, and cutting back when too straggling. If raised from good seed, there will hardly appear two alike; but it is difficult to procure good seed, and the best way is to save it yourself from the most striking flowers. They will grow in any kind of soil, with plenty of moisture; and if sown in the autumn, in a green-house, will bloom the next summer. —*The Gardener and Practical Florist.*



[The Casa Lonja.]

THE CASA LONJA, OR EXCHANGE, OF BARCELONA,

AND ITS GRATUITOUS ACADEMIES.

BARCELONA, the capital of the province of Catalonia, and justly considered as the second city in Spain, on account of its commerce, the intelligence of its inhabitants, and their advancement in the arts and sciences, has been already described by us in No. 259. But in this article we purpose to enter more fully into the description of its Casa Lonja, or Exchange; an establishment of which the inhabitants are justly proud.

This edifice is beautifully situated in the largest square of Barcelona, called *La Plaza del Palacio*, close to the sea-gate and Custom-house, and in front of the Captain-General's palace, from which the square takes its name.

The project of an establishment where the merchants and tradesmen might assemble for the transaction of business was first formed in the year 1339, but nothing was done until 1383, when a curious Gothic edifice was erected, containing various offices; but its principal merit was a spacious and lofty hall, supported by four columns, which was the Exchange, according to the usual acceptation of the term. In 1770 the authorities resolved to form an establishment worthy of the commercial importance at which Barcelona had arrived; and the construction of a new edifice was intrusted to a Catalonian artist named Don Juan Soler, who commenced it in 1772. He died in 1794, and this magnificent work was completed by his son. The old building was demolished, with the exception of the above-mentioned hall, which was preserved not only on account of the veneration of the inhabitants for this monument of their ancient prosperity, but because its solidity was unimpaired, that it was a fine specimen of Gothic architecture, and was peculiarly adapted to the purpose to which it was built. It is 116 feet long, 75 wide, and its height extends to the second story of the new edifice, which is built over it. The engraving at the head of this article will impart a correct idea of this magnificent structure. The principal entrance is from the *Plaza del Palacio*, or Palace Square. In the *patio*, or interior quadrangle, are four white-marble statues, representing Europe, Asia, Africa, and America: they are by Catalonian sculptors, and are extremely well executed. The staircase is very fine: it is double, with two spacious landing-places. At the foot are two statues in white marble emblematical of Commerce and Industry.

On the principal floor is a noble hall where the public examinations take place; likewise the saloon where the Junta of Commerce hold their sittings: the latter is adorned with several statues and groups, among others an excellent copy of the Laocoon; the painted ceiling exhibits allegorical subjects suited to the Institution. The furniture is rich and in excellent taste, and under a superb canopy of crimson velvet is a portrait of the young Queen Isabel. On the same floor is the hall of the Tribunal of Commerce, fitted up and decorated in accordance with its destination.

The Casa Lonja is built entirely of freestone. The pavement of the Exchange, where the merchants assemble, the flooring of all the official saloons on the first story, the balustrades of the balconies, and those of the principal staircase, are of white marble.

In the other parts of the building are the gratuitous academies, founded by the Junta of Commerce. They are noble proofs of the interest taken by the mercantile body in the welfare and improvement of the inhabitants, and have excited the admiration of those foreigners who have inspected them.

The first academy is that for the study of Navigation. The course lasts two years, and includes every part of nautical science:—there are globes, charts, nautical and mathematical instruments of all kinds, and able professors to teach the use of them; the lessons consist of two hours daily excepting during the vacations.

The gratuitous School of Design is of a very superior description, and is numerously attended. Its officers are, a director-general, two subdirectors, four chief and seven under masters; all of whom are well qualified, and are most punctual and assiduous in

attending to their respective classes. All the needful materials for prosecuting their studies are supplied gratuitously to the pupils. The fittings up of the different rooms are convenient, and during the winter season there is a small jet of gas in front of each desk. Barcelona being a large manufacturing city, great attention is paid in this department to instruction in those branches of the art applicable to the more useful purposes; such as designs for the ornamental parts of architecture, for the decoration of houses, for all sorts of furniture, and the invention of patterns for printed cottons.

In the academy for engraving, the copper-plates, burines, and whatever other articles the professors may state to be necessary for their pupils, are supplied by the Junta gratuitously.

The school for oil-painting is supplied with a variety of pictures selected from the gallery of the Casa Lonja, where there is an extensive and valuable collection of the works of the first masters, both of the Spanish and the other celebrated schools. These paintings are copied by the pupils, and are changed for others as circumstances may require.

There is a gratuitous course of lectures on chemistry as applicable to the arts. It lasts two years—the apparatus is complete. Short-hand is also taught to the pupils, in order that they may the more readily profit by the lectures of the different professors.

The other gratuitous classes in the Casa Lonja are—book-keeping by double entry; natural philosophy, the museum and apparatus are extensive and complete; political economy; architecture; agriculture and botany; practical arithmetic and geometry; geography; mathematics; the French, English, and Italian languages; civil engineering—for the study of this useful science there are models of the most useful and perfect machines which have been invented in countries where the greatest progress has been made. There is also a steam-engine, and a gasometer, which supplies the gas (made from fish-oil), for the school of design, &c. already spoken of. The pupils are taught to apply the theory they have learnt, by constructing machines on a small scale, for which the necessary tools and materials are supplied gratuitously.

In the school of naval architecture, also, the same facilities as to models and tools are afforded; and the principles of ship-building, as regards both ships of war and merchant-vessels, are practically developed.

The Junta of Commerce of Barcelona not only established these magnificent gratuitous academies, but it grants annual premiums to those pupils who have most distinguished themselves; these premiums consist of copies of the best works on the different studies. The Junta also grants pensions to some of the young students, in order that they may proceed to foreign countries, or to Madrid, to improve themselves in the fine arts. These pensions are continued for such period as the Junta may consider necessary for the accomplishment of the object in view.

In addition to these benefits conferred on the inhabitants of Barcelona, the Junta publishes, at its own expense, a Journal of Agriculture and Art, in order to disseminate more widely the knowledge imparted in their gratuitous schools.

USEFUL APPLICATIONS OF THE BEECH-TREE.

[Concluded from page 160.]

THE BEECH-OIL PROJECT OF QUEEN ANNE'S REIGN.

In our former article on this subject, we intimated that there were circumstances connected with the economical uses of the beech-fruit, or 'mast,' deserving of a little attention. The matter was of no less importance than the projecting of a powerful and wealthy joint-stock company for the manufacture of beech-oil from the fruit of the beech-tree; a project which, one hundred and twenty years ago, narrowly failed in drawing many persons into a "bubble." Before speaking of this notable scheme, it will be right to describe the fruit from whence the oil was to be obtained.

The fruit contains two nuts within the calyx or sheath; and when ripe the calyx opens, and the nuts frequently drop out by themselves. Each nut has three very sharp angles, and contains an oleaginous substance fit to eat. Gerard speaks thus of the excellent effect which the nuts had in fattening swine, deer, and pigeons:—"With these mice and squirrels be greatly delighted, who do mightily increase by feeding thereon; swine also be fattened herewith, and certain other beasts; also deere do feed thereon very greedily. They be likewise pleasant to thrushes and pigeons." Parkinson, writing in 1640, says that the beech is planted in parks, forests, and chases, to feed deer; but in other places to fatten swine, "whose fat," he adds, "will be softer than theirs that are fattened with acorns." Modern opinions, however, have reversed this doctrine; that is, if Parkinson meant the "softening" of the fat as a favourable circumstance. The fat of the animal becomes oily, does not keep long, and wastes in boiling. The wild animals, such as badgers, seek for these nuts with avidity, and fatten speedily on them. Evelyn speaks of dormice, which, "harbouring in the hollow trees, grow so fat, that in some countries abroad they take infinite numbers of them, I suppose to eat. What relief they give to thrushes, blackbirds, fieldfares, and other birds, everybody knows."

These, then, are the portions of the beech tree from which it was proposed, in Queen Anne's reign, to produce oil for lamps and other purposes. Aaron Hill, the dramatic writer, was the mover of the wires in this piece of commercial machinery. We have now before us three pamphlets, published in 1714 and 1715, the titles of which will speak most eloquently to the minds of those who know anything about joint-stock projects. One of them runs thus:—'Proposals for raising a Stock of One Hundred Thousand Pounds: for laying up great quantities of Beech-mast for Two Years: at an interest of Forty-five Pounds per Cent. per Annum to the Subscribers, and upon a Security whereby they will always have in their own hands above ten times the value of the sum they contribute. To which is added, a particular Account of the Nature, Benefit, and Design of the Undertaking.' The second pamphlet somewhat varies the tempting offer in its title-page:—'An Impartial Account of the Nature, Benefit, and Design of a New Discovery and Undertaking, to make pure, sweet, and wholesome Oil from the Fruit of the Beech-tree. By Authority of Her Majesty's Royal Letters Patent, under the Great Seal of Great Britain. With particular Answers to every Objection which has been made, or may reasonably be conceived against it. And Proposals for raising a Stock not exceeding Twenty Thousand Pounds: wherein every Hundred Pounds advanced will entitle to an Annuity, for Fourteen Years, of Fifty Pounds per Annum, and for a less Sum proportionably, upon a good and solid Security.' Of what nature was this security, and the machinery of the project, we are informed by Aaron Hill himself, in a third pamphlet, purporting to be an 'Account of the Rise and Progress of the Beech-Oil Invention, and all the Steps which have been taken in that Affair, from the first Discovery to the present Time. As also, what is further designed in that Undertaking: 1715.'

In this last-mentioned pamphlet, which consists of somewhat above a hundred pages, the first ten or twelve are devoted to a few high-toned remarks on the ab-

surdity of laughing at a new project merely because it seems new and strange. About an equal space is devoted to notices of past projects which had, in their day, seemed equally absurd. Having thus cleared the ground for his beech-oil project, his patriotism bursts forth thus:—"While every man is ready enough to run forward with the herd, and complain how many millions the nation stands indebted for, nobody considers himself concerned so far as to consider by what means the public credit may be cleared from so prodigious an incumbrance. We are poorly contented to look upon it as a thing impossible; and yet is this giant's task an easy undertaking, and cannot but be universally acknowledged so, as soon as the proposition shall be made in parliament, where immediate birth may at any time be given to a fund which, without the least oppression or complaint, will be capable to supply at once as many millions as will pay off all the debts of the nation, and deliver us from *poor's rates*, *excise*, *land-tax*, or almost any tax at all for ever after."

Hill then gives an account of the manner in which he first became acquainted with the astonishing virtues of the beech-nut. He was, he says, in Naples in the year 1700, where, having caught a cold, he was recommended to take some almond-oil, which he himself saw expressed from the almonds in the shop of the apothecary. A few days afterwards he went with a friar to Mount Vesuvius, and during their route passed through a forest of beech-trees. The trees were loaded with fruit, which hung down so as to impede his progress; and by beating them with his stick they easily became detached, and he put a few of them in his pocket. Upon tasting some of these nuts, he found a similitude of taste between them and the almonds, and he says he bethought him of trying whether the one might not be made to yield oil as well as the other. Circumstances then drove the matter out of his thoughts, and he forgot it until, in returning to England in 1712, he happened to pass through a thick beech-forest near Henley. The boughs were loaded with fruit, and his thoughts instantly recurred to his Italian adventure.

Then was the time for the formation of his project. He tells us that he made inquiries how much oil was used yearly by the manufacturers and others; how much beech-mast could be procured yearly; and how much oil could be yielded by it. He informs us that one bushel of mast will yield two gallons of excellent oil, and that England had abundance of mast for supplying all England with oil.

After being laughed at as a projector, he applied for and obtained a patent, and immediately sought to establish a joint-stock company to carry out the patent (a plan to which there is no scarcity of modern parallels). This first proposal was to obtain subscribers to a fund of twenty thousand pounds, of which a fourth should be paid down at once, and all the rest within a short time; that the subscribers should receive (from the enormity of the profits, of course) fifty per cent. for fourteen years, the limit of the duration of the patent; and that directors, &c. should be chosen. Hill says that all the sum, and "ten times more," was proffered to him in subscriptions; whereupon he reconsidered the matter, and "resolved to accept of a hundred thousand pounds more," on a different footing. Of this hundred thousand pounds the patentee modestly restricted his own share to "one-tenth of the whole," for his invention, patent, trouble, &c. The first project, with a capital of twenty thousand pounds, was for making beech-oil. The second, with the larger capital, was to be a kind of Beech-mast Granary Company, for collecting beech-mast from all quarters, and storing it till wanted; and one of its provisions, an extraordinary one in its way, was this:—"That the patentee should provide granaries, into which the directors should put storekeepers, &c., to receive and pay for whatever beech-mast the patentee should send in, at any price not exceeding one shilling per bushel; which mast they were to redeliver to the order of the patentee, upon payment of a double price per bushel to what they paid for it; by which means the subscribers, who were bound to quarterly dividends, would receive back in parts their principal and interest together, and in two years' time make a profit of cent. per cent. on their subscriptions." How could such a tempting offer be resisted?

Hill then tell us of the statistical inquiries which he made respecting the consumption of oil among the manufacturers, the extent of mast which could be procured in England, and so forth. It appears, however, that a blight which occurred among the English beech-trees so alarmed the subscribers to the granary scheme, that it became eventually knocked up. Hill thereupon built up a new scheme, for a Beech-Oil Company on a different basis, but with a similar proviso that he should have one-tenth of the whole capital to himself. To what extent Hill succeeded in getting subscribers to his third scheme does not clearly appear, for he was not a man of such note as to have his life minutely traced in our biographies: but it appears that, after negotiations and trials of three year's duration, the scheme was utterly abandoned as a failure; and we may readily guess, that the subscribers were the chief losers.

But although beech-oil was thus a failure when made the groundwork of such magnificent schemes, yet it is a *bonâ fide* product in France, and is applied to many uses. Linnæus said that scarcely any oil can be obtained from the beech-mast in cold climates, and this may afford some clue to the failure in England. In France, large quantities of oil are made from it; and this oil is considered excellent not only for burning in lamps, but also for cooking, especially in frying fish. The forests of Eu and of Crécy, in the department of the Oise, have been known to yield in a single season more than a million sacks of beech-mast; and in 1779 the forest of Compiègne near Verberie, in the department of the Somme, afforded oil enough to supply the wants of the district for more than half a century. From this fact it appears that, in a favourable climate, the beech is really an important oil-producing agent.

Michaux gives the following account of the mode of procuring the oil:—The fruit is gathered as soon as it is ripe; since it is liable to be injured by the rain. It is swept together upon the ground, and is afterwards cleansed with fans or in mills; but the harvest is increased by shaking the trees and receiving the nuts upon sheets extended beneath.

Being thus collected in dry weather, and thoroughly cleansed, they are spread, like corn, in a garret or other place secure from humidity, and are frequently turned. They are found to be better and more productive when dried insensibly in this manner than when exposed to the sun. The oil is abundant only when the fruit is perfectly ripe. The season for extracting it is from the beginning of December to the end of March; if the operation be longer delayed, the nuts are liable to be injured by the warmth of the season.

The skin is commonly ground with the kernel; but as the product in this way diminishes a seventh, it is sometimes deemed more advantageous to separate them, which may be done in a flour-mill properly adjusted. The kernel is immediately reduced to a paste by a vertical stone or by a pestle mill. As the paste becomes dry in the process, water is added in the proportion of one pound to fifteen pounds of fruit, to prevent its being impaired by the heat.

The paste is sufficiently reduced, when the oil can

be discharged by the pressure of the hand. It is submitted to the press in sacks of coarse linen, of wool, or of hair; and the force is gradually applied and long continued, so that the oil may be completely expressed. Three hours at least are required in an ordinary press. To prepare the paste for a second pressure, it is pulverised, a proportion of water being added smaller than at first; and the whole is warmed by the careful application of a moderate heat. A wedge-press is commonly employed in the second operation.

With skill in the process, Michaux says that the oil is equal to one-sixth of the fruit. Its quality depends upon the care with which it is made, and upon the purity of the vessels in which it is preserved. It is then twice drawn off during the first three months after it has been made, without disturbing the dregs, and a third time at the end of six months. It arrives at perfection only when it becomes limpid, several months after its extraction. It improves by age, lasts unimpaired for ten years, and may be preserved longer than most other kinds of oil.

Mr. Loudon says—"The *tourteaux*, or remains of the nuts, from which the best oil has been extracted, are given to swine, cows, and poultry, which fatten rapidly on them. A coarser oil, for burning, is made by grinding the mast without taking off the shells, and the tourteaux from this oil, which are too hard and husky to be eaten, are used for making torches; and hence the name of *tourteau*, which is generally applied to a torch or link in France. In those districts of England where the beech-tree abounds in natural forests, it might perhaps be worth while to make beech-oil for private use, both as a substitute for olive-oil, and for lamp oil." Steeping in water, drying, grinding, and pressing, are the processes recommended.

FISH-HOOKS.

It is remarkable to observe how keenly a sportsman—let his sport be of what kind it may—tests and estimates the quality of the implements with whose aid he carries on his avocation. The fowling-piece, the cricket-ball and bat, the "eight-oared cutter," the sailing-yacht—to say nothing of the living implements, such as horses and dogs, employed by the hunter, the racer, and the shooter,—have been by degrees brought to such a pitch of excellence, that we might almost suppose further improvement to be impossible. There are certain names, too, so fixedly attached to many of these sporting implements, as those of the most favourite manufactures, that it is evident there is a kind of standard adopted in each case, as that to which all the manufactured specimens ought to tend. How the sportsman prizes his "Manton," and the rower his "Searle" or his "Lyon," and the cricketer his "Duke," is well known in the world of sport, and partially known beyond that sphere; but it would perhaps hardly be expected by the uninitiated that, in the sport of angling, the very *fish-hooks* have a halo of excellence and beauty about them: a "Kirby" or an "O'Shaughnessy" seeming to possess, in the eye of a thorough-bred angler, certain qualities which call forth his high admiration. A few words from a few anglers will afford us a little interesting information about fish-hooks and their manufacture.

One of the earliest, if not the earliest, printed book containing anything like a systematic notice of angling, is a very remarkable work under the title of 'Treatyses perteynynge to Hawkynge and Huntynge: with other dyvers playsant materes, belongynge unto Noblesse; and also, a ryght noble Treatyse of Coatarmours [coat-armoury]; a Treatyse of Fyshynge with an Angle; endying with a Treatyse whyche specyfyeth of Blasynge of Armys.' This book was printed by Wynkyn de Worde at Westminster, in 1496; and has been attributed to the pen of a lady named Dame Juliana Berners or Barnes. Much controversy has been carried on among literary antiquarians, in reference to the authorship of the volume; but of this we shall not take heed here. Suffice it to say that the 'Treatyses' are generally spoken of in connexion with the name of Juliana Berners, a spirited lady of the fifteenth century; although it must be owned that many of the details are such as we should scarcely expect to meet with from the pen of a lady.

In the 'Treatyse of Angling,' or, as it termed, 'Fyshynge with an Angle,' there is an enumeration of the various implements required by the angler, and directions how to prepare the rods, lines, baits, &c. Then follows a paragraph relating to fish-hooks, which, both from the specimen which it affords of the orthography of Henry VII.'s time, and from the manufacturing instructions which it imparts, is a curiosity in its way:—"Ye shall understonde that the moost subtyll and hardyste crafte in makynge of your harnays is for to make your hokis: for whoos makynge ye must haue fete fyles, thyn and sharpe and smalle beten: a semy clam of yren; a bender; a payr of longe and smalle tongys; an harde knyfe somedeal thycke; an anuelde [anvil]; and a lytyll hamour. And for smalle fysshe ye shall make your hokes of the smalest quarell nedlys that ye can fynde of steele; and in this wyse: ye shall put the quarell in a redde charekcole fire tyll that it be of the same colour that the fyre is. Thenne take hym out and lete him kele; and ye shal fynde hym well alayd [annealed?] for to fyle. Thenne reyse the berde with your knyfe, and make the poynte sharpe. Thenne alaye hym agayn: for elles he woll breke in the bendynge. Thenne bende hym lyke to the bende fygured hereafter in example [here is inserted representations of about a dozen kinds of fish-hooks]. And greeter hokes ye shal make in the same wyse of gretter nedles; as broderers nedlis; or taylers; or shoemakers spere poyntes; and of shomakers nayles in especyall the beste for grete fysshe; and that they bende atte the poynte when they ben assayed, for elles they ben not good. When the hoke is bendyd, bete the hynder ende abrode; and fyle it smothe for fretynge of thy lyne. Thenne put it in the fyre agayn, and geve it an easy redde hete. Thenne sodaynly quenche it in water; and it woll be harde and stronge. And for to have knowledge of your instrumentes, lo theyme here in fygure portrayd." This "figure portrayd" is a wood-cut representing, very rudely, as may be supposed, the implements employed in hook-making.

It would appear from these singular instructions, that anglers were wont to make their own fish-hooks in those days; and it is not improbable that such has been frequently the case since.

A century or two afterwards, old Izaak Walton, the veritable "Piscator," makes a few observations which seem to show that fish-hooks, like the other implements of fishing, were procured at certain places for which a reputation had been acquired; and the successive editions of the 'Complete Angler' point out the names of several persons who carried on those branches of manufacture. Thus, in the first edition, *Piscator*, on the "fifth day" of the narrative, is made to say:—"I will go with you either to Charles Brandons', near to the Swan in Golding Lane, or to Mr. Fletcher's, in the court which did once belong to Dr. Nowel, the Dean of Paul's, that I told you was a good man, and a good fisher: it is hard by the west end of St. Paul's Church: they be both honest men, and will fit an angler with what tackling he wants;" to which *Viator* replies:—"Then, good master, let it be at Charles Brandons', for he is nearest to my dwelling, and I pray

let's meet there.' In the second edition the same names occur, but after the words "St Paul's Church" comes this passage:—"But if you will buy choice hooks, I will one day walk with you to Charles Kerbye's, in Harp Alley in Shoe Lane, who is the most exact and best hook-maker that the nation affords. They be all three honest men." The third and fourth editions give this passage the same as the second, but in the fifth edition we have:—"I will go with you either to Mr Margrave, who dwells amongst the booksellers in St Paul's Church-yard, or to Mr John Stubs, near to the Swan in Golding Lane; they be both honest men, and will fit an angler with what tackling he wants." Sir Harris Nicolas, in his costly edition of Walton and Cotton, offers a suggestion that Brandons, Fletcher, and Kerbye may have all died in the interim between the dates of publication of the second and the fifth editions; and he adds:—"The Charles Kerbye above alluded to obtained from Prince Rupert a method of tempering his hooks, which long continued in the family. A lineal descendant of his, whose hooks for their shape and temper exceeded all others, was in 1760 living in Crowther's-well Alley, near Aldersgate Street. Of the Mr Margrave mentioned in the fifth edition we meet with some information in a kind of advertisement appended to an early edition of Cotton's part of the 'Complete Angler,' running thus:—'Courteous Reader,—You may be pleased to take notice that at the sign of the Three Trouts in St Paul's Churchyard, on the north side, you may be fitted with all sorts of the best fishing tackle by JOHN MARGRAVE.'"

Descending from the times of Walton to those of Sir Humphry Davy, we find the accomplished author of 'Salmonia' discoursing as eloquently and energetically about fish-hooks as about any other subject to which he bent his powerful mind. This remarkable work, as is pretty well known among general readers, consists of a series of conversations about angling, divided into a certain number of 'Days,' like Walton's 'Complete Angler.' As Walton carried on his conversation by means of 'Piscator' the angler, 'Venator' the hunter, 'Auceps' the falconer, and others, so does Davy form a conversational circle of four friends: 'Halieus,' a fly-fisher; 'Ornither,' a field sportsman; 'Poietes,' a general lover of nature; and 'Physicus,' a natural philosopher.

On the "Sixth Day" the friends are fishing for salmon. Poietes catches a fish, but the fish, making a violent spring, escapes; and this escape gives rise to the following conversation, in which there is no doubt that Davy expressed his own individual opinions under cover of the fictitious characters:—

"*Halieus.*—You played that fish so well that I am angry at his loss: either the hook, link, or line failed you.

"*Poietes.*—It is the hook, which you see is broken, and not merely in the barb, but likewise in the shank. What a fool I was ever to use one of these London or Birmingham made hooks!

"*Hal.*—The thing has happened to me often. I now never use any hooks for salmon fishing except those which I am sure have been made by O'Shaughnessy of Limerick; for even those made in Dublin, though they seldom break, yet they now and then bend. *Here* is a fly nearly of the same colour as that which is destroyed, and I can tell you that I saw it made at Limerick by O'Shaughnessy himself, and tied on one of his own hooks. If you should catch with it a fish even of 30 lbs., I will answer for its strength and temper: it will neither break nor bend.

"*Poiet.*—Whilst I am attaching your present, so kindly made, to my line, pray tell me how these hooks are made? for I know you interested yourself in this subject when at Limerick.

"*Hal.*—Most willingly. I have even made a hook, which, though a little inferior in form, in other respects, I think I could boast as equal to the Limerick ones. The first requisite in hook making is to find good malleable iron of the softest and purest kind—such as is procured from the nails of old horse-shoes. This must be converted by cementation with charcoal into good soft steel, and that into bars or wires of different thickness for different-sized hooks, and then annealed. For the larger hooks, the bars must be made in such a form as to admit of cutting the barbs; and each piece, which serves for two hooks, is larger at the ends, so that the bar appears in the form of a double pointed spear three, four, or five inches long: the bars for the finer hooks are somewhat flattened. The artist works with two files, one finer than the other, for giving the point and polishing the hook; and he begins by making the barb, taking care not to cut too deep, and filing on a piece of hard wood, such as box wood, with a dent to receive the bar made by the edge of the file. The barb being made, the shank is thinned and flattened, and the polishing file applied to it; and by a turn of the wrist round a circular pincers, the necessary degree of curvature is given to it. The hook is then cut from the bar, heated red hot by being kept for a moment in a charcoal fire, then plunged while hot into cold water; then tempered by being put on iron that has been heated in the same fire till it becomes a bright blue; and whilst still hot it is immersed in candle-grease, where it gains a black colour. It is then finished.

"*Physicus.*—Nothing seems simpler than this process. Surely London might furnish manufacturers for so easy a manipulation? And I should think one of our friends, who is so admirable a cutler, might even improve upon the Irish process: at least the tempering might be more skilfully arranged."

Thus do the salmon-fishers converse about their hooks; and there can be no doubt that the details of the conversation were meant to convey real facts and opinions.

Mr Blaine, in his 'Encyclopædia of Rural Sports,' while speaking of the Kirby, or Kerby, who was said to have been taught the process of tempering fish-hooks by Prince Rupert, remarks:—"Mr Charles Kirby was probably a manufacturer of iron ware at that time, and among other articles of fish-hooks, for we are told that the inventive prince communicated the art to Mr Kirby, who from his instructions first manufactured [illegible], and that in his family the secret (if any secret it can now be) remains. Certain it is that Kirby hooks are still in high estimation and extensive demand."

We believe that the large bulk of fish-hooks are now made at Redditch, the needle-making metropolis, by a great number of persons who devote their attention to this branch only. They are partly made in factories, where the division of labour is carried out, and partly in the houses of the workmen who make the hooks for the master manufacturers. The variety of sizes is very great, some of the hooks being as thin as the finest needles, and the shapes are almost as various as the sizes. The process differs somewhat from that described by Sir Humphry Davy as having been practised at Limerick. The wire is first *cut* to the proper length; then *barbed*, or cut in such a manner as to produce the barb; then *pointed* by means of a file; next *bent*, or put into its curved form, by passing it round a convex surface; then *hardened* in the fire; then *tempered* by the heat of a sand-bath brought to such a temperature as to impart the requisite degree of strength and elasticity; next *scoured*, by rotating in a barrel containing emery and soap; and lastly *blued*, by placing them in a sand-bath similar to that employed in tempering.



[English Sheep Drover.]

SHEEP DROVERS.

A VERY interesting department of husbandry is sheep farming. A complete view of all the operations by which about twelve million sheep and lambs are annually prepared for the butcher in Great Britain would show that it demands much intelligence and foresight as well as an active and industrious spirit. Unless agricultural improvements had been previously carried to a very high point by extending, and at the same time, economising the resources of the land, this country could not possibly supply the existing demand for animal food.* By one class of improvements, therefore, the land is made to sustain about thirty million sheep; but without other improvements, which have been chiefly effected within the last sixty years, twice this number of sheep would have been required to furnish the quantity of mutton consumed at the present time. In other words, the average duration of life in sheep is one half at least less than it was in the last century; that is, instead of four or perhaps five years on the average being required to prepare them for market, the fattening properties of the animal have been so successfully cultivated by breeders, as to enable the grazier to fatten in two years or even less. The theory of this branch of agricultural improvement will be understood from the following extract:— "Grazing animals in a wild state, according to Dr. Liebig, will hardly become fat at all. Deer in a park, for the same reason, are not killed before they are six or seven years old; and many may even now remember that mutton was once eaten when five years old. But by selection of individuals in breeding it was found that this time might be shortened. First, the Leicesters, then our larger long woolled sheep, the Cotswolds, and last the short-wools or Southdowns, as well as the others, have been brought to market as mutton in four, three, two, and lately on some farms at one year of age; so that, to say nothing of root-crops having been multiplied four times in weight, the same amount of green food which formerly gave us a sheep only every fifth year is able to produce us now a sheep every year, that is five sheep for one. A deduction must of course be made for the breeding-ewes." (Mr. Pusey's paper already quoted.)

A very large proportion of the twelve million sheep annually slaughtered for food are bought by the butchers at *markets*, which are held weekly, fortnightly, or monthly, in their respective districts. On an average about thirty thousand sheep are sold every

* The course of these improvements is very succinctly shown in the following extract from a paper by Philip Pusey, Esq., M.P., on the 'Progress of Agricultural Knowledge during the last Four Years,' which appeared in the 'Journal of the Royal Agricultural Society of England' in 1842:— "The castles of the old barons were victualled at Michaelmas with salt beeves and sheep, because there was little hay for their winter keep. Afterwards more hay was made, and fresh meat was obtained throughout the year. When the population exceeded the extent of our meadows, the common turnip was introduced; but as this does not well resist frost, it would last only till February. Then came the swede, which carries us on till the end of March. Another class of summer food, clover, had been also introduced, but would not be ready so soon; vetches therefore were sown in autumn, to be fed off in spring. But there is still an interval to be filled, for vetches do not come in as soon as swedes are ended. Mangold-wurzel indeed will carry us through this space of time; but it appears also that while winter feed may be prolonged, spring feed may be hastened by growing an early variety of vetches. The importance of this variety will be seen at once by all flockmasters: if it should stand the trial, the circle of artificial food will be completed throughout the year, and a wonderful triumph, I must say, will be secured by the farmer's skill over the seasons."

week throughout the year at Smithfield market, the number varying from about twenty-four to thirty-five thousand, and sometimes even a larger number. Sheep have generally several distinct journeys to perform at different intervals before they are finally driven to the slaughter-house. We shall speak of different classes of drovers on another occasion.

The spring and autumn months are the principal seasons when the sheep-farmer either makes his purchases or disposes of part of his flock. As soon as the winter is fairly over, the tender herbage of the downs springs up, and the grass of the almost bare uplands begins to offer a succulent bite, and in these situations the number of the flock must be increased. Just at this period the turnips and other green food in the fertile and highly cultivated arable lands are all consumed, and the transfer of the flocks from the exhausted district to one which promises future abundance for some months to come, is an advantageous and economical operation. In the Weald of Kent you will scarcely see any sheep in the summer months, but in the winter the fields are covered with stock which is bought in about Michaelmas of the flock-masters of the downs, at the time when food with them is becoming scanty. In other cases only a breeding flock is permanently kept, and the lambs are disposed of soon after Midsummer. While the butcher makes his purchases at markets, the *fairs* are attended by those whose business it is to feed sheep in one or other of their intermediate stages before they are ready for slaughter. These fairs afford the flock-master an opportunity of adjusting the proportions between live-stock and food. At the great sheep fair at Weyhill in the second week of October, as many as two hundred thousand sheep are sometimes penned; at Ipswich fair about a hundred thousand; at Overton the same number; at Lewes about forty thousand; at Falkirk October tryst about a hundred thousand; and the same number at the great Irish fair at Ballinasloe, held also in October; and there are also numerous fairs on a much smaller scale held in every part of the country. Besides the necessity of proportioning stock to food which gives life to these fairs, there are other circumstances which bring buyers to them. In some cases it is found most profitable to stock wholly with cattle during the summer, and then lean and half-fatted sheep are brought in to be depastured for the winter. Some land will not bear cattle in this season, and can only be grazed in wet weather by sheep.

In the counties near London a great object of the farmer is to supply the metropolis with early lambs, and no flocks are permanently kept. As soon as the lambs are ready for market the ewes are sold to the graziers of Essex and other counties to be fattened. Even in this branch of rural economy, which has for its object the supply of London with lamb, there are two subdivisions; and as the operations of the house-lamb farmer and the field-lamb farmer are different, so this difference, the essence of activity in commerce, brings them occasionally into communication. To the farmer who supplies lambs from the field in April it is a disadvantage when his ewes are too forward, but he may dispose of them in this case to the house-lamb farmer, whose arrangements are made for the dropping of lambs in December and January, when of course they require an extraordinary degree of care. From these instances it will be seen that the circumstances which render it expedient to bring sheep to market often several times before they are finally sold to the butcher, are far more diversified than would at first be supposed. To give another example:—The Leicester sheep thrives very rapidly, but it does not rear lambs for the butcher nearly so well as other breeds, and it is therefore more profitable to keep them for mutton; but it may happen that in the very district which is better adapted for the Leicester than any other sheep, there is a market for lamb which is very tempting for the large profits which it offers. In this case, therefore, the farmer about Michaelmas buys in a flock of Cheviots, or some other breed which answers better than the Leicesters for rearing lambs; and after their lambs have been fattened and sold in June and July, the ewes are next fattened and sent in October. In Scotland the breeding of sheep is most extensively carried on in the more genial counties of the south, but the wethers are bought at the fairs and reared in the highlands. These instances sufficiently prove the necessity for graziers, farmers, and all dealers in sheep resorting every year to the fair; and in the varying quantity of stock which a given district will support at different seasons arises a traffic which affords employment to the drover, though by the extension of green crops, which enable the farmer to rear and fatten on the same land, the necessity for transferring stock from one district to another is diminished.

INDIGO PLANTERS AND PLANTATIONS.

There are circumstances connected with the cultivation of indigo which throw around it many points of interest. The value of the plant in the manufacturing art, the amount of capital invested in the cultivation in India, the vicissitudes which attend the fortunes of an indigo planter, and the seclusion in which this class of persons reside in the country districts of Bengal, all tend to place this branch of commercial industry in an interesting point of view. Let us first notice the general mode of cultivation, and then the habits and habitations of the planters.

We have curious evidence that down to the end of the sixteenth century it was not known in England from what source the dye-drug indigo was procured. This dye was then frequently called *anil* or *nil*. In a book published in 1582, under the title of 'Remembrance for Master S.,' by Richard Hakluyt, the Master S. is instructed 'to know if anil, that coloureth blew, be a natural commodity of Turkey; and if it be compounded of an herbe, to send the seed or root, with the order of sowing, &c., that it may become a natural commodity in the realm, as woad is, that the high price of foreign woad may be brought down.'

The Romans were not so ignorant on the matter, for Pliny knew that indigo was a preparation from a vegetable substance, although he did not know the precise nature of the plant nor the mode of preparation. The drug itself has always been brought principally from India, but it is also produced in the West Indies and America. The warm climates of all these countries has led to an opinion that a tropical region is necessary to the cultivation of the indigo plant; but experiments have been made to show that though the cultivation may be most profitably conducted in the warm climates of Asia and America, yet it may be reared in Europe. M. Bruley some years ago cultivated the indigo-plant in the garden of the Comte de la Vergne, near Turin; and by submitting it to the process employed at St. Domingo, he obtained an indigo which bore favourable comparison with specimens of tropical produce. M. Icard de Bataigne also successfully cultivated the plant in 1805, in the department of Vaucluse in France. These instances, however, are more matters of curiosity than of commercial importance.

But to return. The indigo-plant requires to be grown in a free and rich soil in a warm climate, and the time of sowing is in the rainy season, for it is found that if the soil has not previously imbibed water,

and no rain falls speedily after sowing, the seed becomes heated, corrupts, and is lost. The soil being in a proper state and free from weed, a number of slaves ranged in a line walk across the field making little trenches at about a distance of a foot apart, each [illegible] hole being two or three inches deep. Then, returning in the opposite direction, they drop some [illegible] into each hole and cover them over with earth. [illegible] moist weather the plant comes up in three or four [illegible] afterwards, and the ground around it is then [illegible] fully weeded to prevent the admixture of noxious [illegible] which would deteriorate the quality of the dye. [illegible] about two or three months the plant is ready for [illegible]. If suffered to stand till it run to flower, the leaves become too dry and hard, and the indigo obtained from them less in quantity and less beautiful.

[illegible] parts of India only the leaves are used to [illegible] the dye, while in other parts a portion of [illegible] is also employed. The indigo planter is also [illegible] manufacturer, and proceeds somewhat as follows:— A large quantity of the herb is put into a vat or cis[tern] with just water sufficient to cover it, and some [illegible] of wood are laid on the herb to prevent it from [illegible]. The plant begins to ferment sooner or later, [according] to the warmth of the weather and the maturity of the plant, and varying from six hours to twenty [illegible] liquor becomes hot, throws up a plentiful froth [illegible] and acquires a violet blue colour. [illegible] the heat increases, the herb [illegible] and the [illegible] is decomposed. [illegible] of the manufacturer [illegible] fermentation at the proper point, if it be [illegible] the plant remains impregnated [illegible] which diminishes the quantity [illegible] Some [illegible] has been [illegible] which [illegible] these [illegible] the fermentation [illegible] Others [illegible] little of the liquor into a silver cup. These are matters of judgment which tax all [the] skill of the manufacturer.

When the liquid is at the proper stage it is drawn off from the herb into a second vat, and there strongly [illegible] by means of [illegible] fixed to [illegible]. The object of this seems to be to separate the [illegible] of colouring matter from the water, and to cause them to settle in a body at the bottom of the vessel. When this separation is completely effected, the clear water is drawn off from cocks in the upper part of the sides of the vessel, and the blue sediment is collected in a third vessel. Here it is suffered to settle for some time longer, then further drained in cloth [illegible] or sacks, and lastly exposed in shallow wooden [boxes] to the action of the air, being at the same time [illegible] from sun and rain.

Before the blue sediment is perfectly dry it is cut into small pieces about an inch square, which detach themselves readily from the box when the indigo is dry. The article is now manufactured, and is brought to market in one of two states: it is either packed in barrels or else in coarse linen sacks enclosed in an ox's hide.

Such is a brief sketch of the mode of cultivating and manufacturing this drug, and the habits and position of the manufacturers may now be noticed.

Mr. M'Culloch states that "the culture of indigo is very precarious, not only in so far as respects the growth of the plant from year to year, but also as regards the quantity and quality of the drug which the same amount of plant will afford even in the same season." Whatever occupation is subject to fluctuations such as these, is almost certain to lead to bold and hazardous speculations, to ample fortunes, to sudden ruin, and to other exceptions from the general course of trade. The districts where the cultivation is carried on too place the indigo planter in an isolated position, generally far distant from the towns of civilized society; and hence these planters have acquired a standing and character peculiar to themselves. They have been often alluded to in very unfavourable terms: thus Bishop Heber says—"The indigo planters are chiefly confined to Bengal, and I have no wish that their number should increase in India. They are always quarrelling with and oppressing the natives, and have done much in those districts where they abound to sink the English character in native eyes." Others who have dwelt longer in India have been able to soften the severe censure thus passed.

It must be borne in mind that capital as well as skill is required to conduct an indigo-work, and this capital can hardly be commanded by the natives, as a body; hence we come to see who are the parties that really embark in these undertakings. There is a paper on this subject in the 'Asiatic Journal,' evidently written by one well conversant with the matter, which gives much instructive information. It is stated that, excepting [illegible] stations in which various manufacturers and [shop]keepers have established themselves, the only Europeans not belonging to the Company's service hitherto settled in the interior of Bengal [illegible] the [indigo] planters. This statement may require a little modification, to suit the changes which may have occurred in the six or seven years elapsed since the statement was made, but it is probably sufficiently near the truth for the present purpose. [illegible] We find Europeans and Indo-Britons of all shades [illegible] [illegible] polished, refined [illegible] most brutal and demoralized [illegible] difficult to say whether the [illegible] or the children of the soil [illegible] the best [illegible] character, many [illegible] Indo-Britons being distinguished by every excellence that can adorn society, and many of the Europeans being equally conspicuous for the exhibition of every vice.

In some few instances the indigo planters live at [a] visiting distance from each other, but often they are wholly isolated. A traveller journeying through some remote and unfrequented place sometimes comes suddenly in sight of a handsome mansion, surrounded by luxuriant gardens, and he finds upon inquiry that it belongs to an indigo planter. Bishop Heber, for instance, while travelling through the wilds of Bengal, frequently encountered either the indigo planters themselves or their houses in spots where no indication of other inhabitants could be met with.

The wives and daughters of the better kind of indigo planters are said to be among the best educated and most elegant women of India; and though often living in what would generally be deemed irksome seclusion, they are seldom left to waste their sweetness on the desert air in respect to marriage; for the wealth of the families generally attracts suitors for the daughters from Calcutta and other large towns. This of course relates more particularly to the families of the most successful planters. There are circumstances attending an indigo planter's life, which render it important that he should have amusements for his leisure hours; and hence the injury which the occupation brings to a coarse-minded man whose amusements do good neither to himself nor others. The planter leads a life of alternate toil and idleness, of great anxiety and dearth of interest. The watching

the crop, the necessary superintendence in person (leading to great exposure during the heat of the day); the cares, mental and personal, attendant on the process of manufacture—a process depending for success upon peculiar states of the atmosphere—are followed by intervals of time during which there is nothing to be done, and during which the owner of the establishment must draw entirely upon his own resources for the employment of his leisure hours. Hence it happens that the house of any indigo-planter who has received anything like a decent education is pretty sure to exhibit a library of books.

The fortunes of an indigo-planter bear considerable resemblance to those of a gambler, and the excitement he feels is nearly as strong. Immense fortunes are sometimes made in one productive season; and frequently, when great success has induced more extensive speculations, some perverse circumstances will entail a total failure, reducing the eager expectant to ruin, and obliging him to begin the world again, with blighted hopes and reduced physical powers. Others toil on, during a considerable number of years, without averaging more than a sufficiency for the maintenance of a family. Others are merely agents, or junior partners working assiduously, with a distant prospect of advantage to themselves, for the benefit of some great firm in Calcutta. There is great incongruity in the condition of the planters, as respects their former condition: nautical men, writers to the signet, merchants, and even missionaries, having become, under the circumstances in which fortune might have placed them at the time, indigo-planters.

The uncertainty which hangs over the operations and condition of this class of men does not arise from any one circumstance, but from a succession of chances. In the first place the ground must be well tilled; then it must be thoroughly weeded. The crop, when up, is liable to wither or dry; or, all at once, a peculiar species of caterpillar makes its appearance, and destroys in the course of a day or night the most favourable prospects which luxuriant fields could offer. Then, in gathering, it is necessary to observe great care; for, if the gatherer shakes off a delicate bloom or farina, which covers the leaves, the value is greatly deteriorated. Then the fermentation in the first vat; the agitation or beating in the second vat; and the subsequent processes—all have to be conducted with such scrupulous exactness, that the chances of failure are many. Thus it will be seen that soil, temperature, insects, and manipulative operations are all included among the circumstances which determine whether the indigo-planter's crop shall be profitable or not.

At the houses of the higher class of planters little or no indication of the calling of the owner is to be seen; his mansion is distinct from the factory, and the whole establishment accords in such case with the taste of a man of some education. One writer, describing an indigo-plantation in the north of India, says:—"The dwelling-house attached to the factory was situated at the extremity of a lane, about the distance of sixty yards from the high road that leads to Benares. Two enormous palm-trees reared their stately heads at the entrance, and on either side of the lane trees were closely planted, affording a pleasant shade. . . . . The dwelling-house contained five rooms on one floor, a hall, and verandah; and the household of our host consisted of ten male servants and five female slaves. In front was a spacious tank, abounding with fish; numerous outhouses, stables containing three fine Arabian horses, and a shed for a large male elephant, encircled the back part of the building, which, with a pair of fine vats for the manufacture of indigo, comprised the principal objects of the factory."

A lower class of plantations is thus described by another writer:—"The house is large, ungainly, and barn-like; the waste, dignified by the name of a garden, is intersected by long rows of sheds necessary for the manufacture; and sunken vats appeared at intervals, in which the plant is soaking. Withinside a sluttish kind of plenty reigns; the apartments have been handsomely furnished, but the furniture has suffered from neglect, and now exhibits various stages of dilapidation; rat-holes, tenanted by numerous families, yawn in the walls; and the dogs repose without ceremony upon the chairs and sofas."

It is to a still lower class that the censure is probably due which has sometimes been heaped upon all alike. "Occasionally the house of an indigo-planter affords the most frightful picture of desolation and decay imaginable; its mouldering and weather-stained walls and roof yielding an inadequate shelter from the elements; while the large comfortless apartments of the interior, the damp and dirt and squalor which prevail within, render the smallest hut, which is clean, well-swept, and in good repair, a far more desirable abode. . . . . Yet there are numbers, both European and Indo-Briton, who are quite content with such a residence, and never dream of giving themselves the trouble of putting it into better condition. Custom has reconciled them to their mode of life, and they have no idea of the horror with which a stranger, better acquainted with the habits of civilized society, surveys the dismal scene. Poverty is not always the accompaniment and cause of all this desolation: it frequently happens that, while the elegancies of life are disregarded, there is no scarcity of grosser luxuries; a plentiful dinner will smoke upon a board covered with a ragged table-cloth, or perchance not graced with any table-cloth at all; claret and Sauterne will appear, as well as beer and brandy; and the lady, though she may indulge in a shawl or a dressing-gown, will still adorn her person with trinkets of value."

Such are the various grades which distinguish the indigo-planters of Bengal.

Outdoor Labour in Switzerland.—None of the women are exempt from field-work, not even in the families of very substantial peasant-proprietors, whose houses are furnished as well as any country manse with us. All work as regularly as the poorest male individual. The land, however, being their own, they have a choice of work, and the hard work is generally done by the men. The felling and bringing home wood for fuel, the mowing grass generally, but not always, the carrying out manure on their backs, the handling horses and cows, digging, and such heavy labour, is man's work; the binding the vine to the pole with a straw, which is done three times in the course of its growth, the making the hay, the pruning the vine, twitching off the superfluous leaves and tendrils,—these lighter yet necessary jobs to be done about vineyards or orchards form the women's work.—*Mr. Laing's Notes of a Traveller.*

Hunting Kangaroos by the Tracks in Australia.—The mode of tracking a kangaroo until it is wearied out, is the one which beyond all others excites the admiration of the natives; this calls out every qualification prized by savages—skill in tracking, endurance of hunger and thirst, unwearied bodily exertion, and lasting perseverance. To perform this feat a native starts upon the tracks of a kangaroo, which he follows until he sights it, when it flies timidly before him; again he pursues the track, and again the animal bounds from him; and this is repeated until nightfall, when the native lights his fire and sleeps upon the track; with the first light of day the hunt is resumed, and towards the close of the second day, or in the course of the third, the kangaroo falls a victim to its pursuer. None but a skilful huntsman, in the pride of youth and strength, can perform this feat, and one who has frequently practised it always enjoys great renown amongst his fellows.—*Captain Grey's Journals.*



[Queen Elizabeth surrounded by her [illegible] — From a print by Vertue.]

PROGRESSES OF QUEEN ELIZABETH
No. V.

HUNSDON—WARWICK, ETC.

The Queen in 1571 resumed her progresses in August, on the 7th of which month she was at Hatfield, and afterwards at Audley Inn or Audley End, the corporation of Saffron Walden waiting on her on the 19th October, and presenting her with a silver-gilt cup, weighing forty-six ounces, which with other expenses amounted to nearly thirty pounds. She appears to have remained here several days, and on the 5th September was at Horeham Hall, near Thaxted in Essex, the seat of Sir John Cutte. From the 14th to the 17th she was entertained at Mark Hall, the property of William Devereux Viscount Hereford, afterwards Earl of Essex, and on the 18th was at Lees, the mansion of Lord Rich, from whence she proceeded to Hunsdon House, the residence of her kinsman, Sir Henry Cary, created Lord Hunsdon by the Queen immediately on her accession, and to whom she was always greatly attached, notwithstanding his somewhat rude independence and uncourtly manners. Sir Robert Naunton, in his 'Fragmenta Regalia,' says of him, "He lived at court on no man's sleeve, but stood on his own bottom till the time of his death, having a competent estate of his own given him by the Queen, who bestowed on him in the first of her reign, Hunsdon House in Hertfordshire, with 4000*l.* (according to the valuation of that age) in fair demesnes, parks, and lands lying about it. Yet this was rather restitution than liberality in her majesty, seeing he had spent as great an estate (left him by his father) in her service, or rather relief, during her persecution under Queen Mary." Lord Hunsdon had some claim to the earldom of Wiltshire, through his mother, the sister of Anne Boleyn, and daughter of Sir Thomas, created Earl of Wiltshire by Henry VIII., but though more than once on the point of receiving it, never actually attained it till, on his death-bed, Elizabeth visited him, and caused the patent and the robes to be laid on his bed, when the blunt old man said, "Madam, seeing you counted me not worthy of this honour whilst I was living, I count myself unworthy of it now I am dying."

Of the Queen's visit on this occasion the most interesting memorial we have is the engraving at the head of this paper. It is the copy of an old picture found by the celebrated engraver and antiquary Vertue, at Lord Digby's seat at Coleshill in 1647, where the tradition was that it represented Queen Elizabeth doing honour to a young married couple. Vertue thought he had identified it with Hunsdon House, and that it had been painted for Lord Hunsdon by Marc Gerards, painter to Queen Elizabeth; and though Gough has shown some reason to doubt whether the place delineated is really Hunsdon House, there can be no doubt of its representing one of Elizabeth's visits in her progresses, and Vertue's identification of the personages is most probably correct.

The print is thus described by the industrious antiquary:—"The Queen is seated in a canopy chair of state carried by six gentlemen, several knights of the Garter, with their collars of that most noble Order, walking before the Queen, and many favourite ladies following in the train. The yeomen of the guard follow, and the band of gentlemen-pensioners line the way. Amongst the knights of the Garter, Dudley Earl of Leicester, is nearest to the Queen. Henry Lord Hunsdon, carries the sword of state before her Majesty. As these knights walk two and two, the next is William Cecil, Lord Burghley, Lord High Treasurer, with his white staff in his hand. Next before him is Charles Howard, admiral, afterwards Lord Nottingham. The other three knights of the Garter (Lords Clinton, Russel, and Sussex), as those before mentioned, each of them having a ribbon about his neck, with a small gem or intaglio appendant to it,

thereon a profile of her Majesty's countenance, which additional ornament, it is conjectured, was designed to represent these noblemen to be the Queen's favourites. The place where this procession appears to be, is within the inclosure of the court-yard of Hunsdon House; the back part is the prospect in this picture; they are passing round, as it were, by the aqueduct to come to the front entrance. This house was entirely built by King Henry VIII., and afterwards the front only new rebuilt by Lord Hunsdon, as it still remains, both ways being encircled with water, and two arched bridges to pass over to the house. As the back front is the prospect to this picture, so at a distance, on a hill, appears a small old castle, perhaps Stortford Castle, by which the river Stort passes, and joins the river Lea at Stansted, where, near the bridge, are boats or skiffs purposely represented. . . . . I have some reasons to think that amongst the ladies that follow the Queen, the foremost in white may be the Lady Hunsdon; on her right-hand Lord Hunsdon's sister, Lady Katharine, who was wife to Admiral Howard; and next behind, in a dark, grave habit, Lady Mary Bolen, mother of Lord Hunsdon: all the ladies are richly adorned with jewels to grace the solemnity of this procession. And as this noble lord was captain of the band of gentlemen-pensioners, he might order or appoint their attendance (as they appear) to line the way with their partizans in their hands."

Hunsdon House passed subsequently into the family of Calvert, in which family it is still vested, but the buildings have been totally altered and modernized, and no memorials remain of the Carys except in Hunsdon Church.

The Queen was afterwards at West Horsley, in Surrey, then at Theobalds, thence to St. James's, and thence to Richmond in October, where she finished her progress, being taken "suddenly sick at the stomach, and as suddenly relieved by a vomit."

In the summer of 1572 she resumed her progresses by visiting Havering-atte-Bower in Essex, and thence proceeded to Theobalds, Gorhambury, Dunstable, and Woburn, but no particulars of these visits have been preserved. On the 12th of August, however, she reached Warwick, having dined at Ichington, two miles from that town, with Edward Fisher, who had been secretary to the Lord Protector Somerset. "The weather having been very foul long time before, and the way much stained with carriage, her Majesty was led thorough Chesterton pastures, and so by Oakley, and by that means came towards the town by Four-Mile Mill," where she was met by the corporation, whose recorder, Edward Aglionby, welcomed her with an oration, which ended, the Bailiff approached the coach in which she was seated with Lady Warwick, and presented her with the city mace, and a purse "very fair wrought, and in the purse twenty pounds, all in sovereigns," which she accepted, replying, "Bailiff, I thank you, and you all, with my heart, for your good wills; and I am very loth to take anything at your hands now, because you at the last time of my being here (probably in 1565) presented us to our great liking and contentation; and it is not the manner to be always presented with gifts: and I am the more unwilling to take anything of you, because I know that a mite of their hands is as much as a thousand pounds of some others. Nevertheless, because you shall not think that I mislike of your good wills, I accept it with hearty thanks to you all, praying God I may perform, as Mr. Recorder sayeth, such benefit as is hoped." Then returning the mace, she called the Recorder to her, saying, "Come hither, little Recorder; it was told me that you would be afraid to look upon me, or to speak boldly; but you were not so fraid of me, as I was of you, and I now thank you for putting me in mind of my duty, and that should be in me." Mr. Griffin, the preacher, then approached, and presented her with some Latin verses, which commence thus:—

> *T* riste absit letum; dignare amplectier omn *n*
> *u* t firmo vitæ producas stamina nex *u*
> *e* xplorans gressu cepisti incedere Cale *b*
> *l* urida sulphurei qua torquent tela ministr *i*

the lines being so worded that the initial and final letters form the words "Tu, Elizabeta, viro nubis, o mater eris." The procession, a numerous and splendid one, then advanced into the town, and the Queen took up her residence in the castle. This was on Monday. On Wednesday she paid a visit to Kenilworth, leaving her retinue in Warwick, and remained there till Saturday, when she returned. On the Sunday "it pleased her to have the country-people resorting to see her, dance in the court of the castle, her Majesty beholding them out of her chamber-window; which thing, as it pleased well the country-people, so it seemed her Majesty was much delighted, and made very merry." These were the means by which Elizabeth, in spite of the severity and despotism of her government, acquired and deserved the title of "Mother of her People." In the evening was an exhibition, characteristic of the time, but which had a melancholy termination. "That afternoon passed, and supper done, a show of fireworks prepared for that purpose in the Temple fields was set abroach, the manner whereof this writer cannot so truly set forth as if he had been at it, being then sick in his bed. But the report was, that there was devised on the Temple ditch a fort made of slender timber, covered with canvas. In this fort was appointed divers persons to serve as soldiers, and therefore so many harnesses as might be gotten within town were had, wherewith men were armed, appointed to show themselves; some others appointed to cast out fireworks, as squibs and balls of fire. Against that fort was another castle-wise prepared, of like strength, whereof was governor the Earl of Oxford, a lusty gentleman, with a lusty band of gentlemen. Between these forts, or against them, were placed certain battering-pieces, to the number of twelve or fourteen, brought from London, and twelve fair chambers, or morter-pieces, brought also from the Tower, at the charge of the Earl of Warwick. These pieces and chambers were by trains fired, and so made a great noise, as though it had been a sore assault; having some intermission, in which time the Earl of Oxford and his soldiers, to the numbers of 200, with qualivers (short muskets) and harquebusses, likewise gave divers assaults; they in the fort shooting again, and casting out divers fires, terrible to those that have not been in like experiences, valiant to such as delighted therein, and indeed strange to them that understood it not; for the wild fire falling into the river Avon, would for a time lie still, and then again rise and fly abroad, casting forth many flashes and flames, whereat the Queen's Majesty took great pleasure; till after, by mischance, a poor man or two were much troubled; for at the last when it was appointed that the overthrowing of the fort should be, a dragon flying, casting out huge flames and squibs, lighted upon the fort, and so set fire thereon, to the subversion thereof; but whether by negligence or otherwise, it happened that a ball of fire fell on a house at the end of the bridge, wherein one Henry Cowper, otherwise called Miller, dwelled, and set fire on the same house, the man and wife being both in bed and in sleep, which burned so as before any rescue could be, the house and all things in it utterly perished, with much ado to save the man and woman; and besides that house, another house or two near adjoining were also fired, but rescued by the diligent and careful help, as well of the Earl of Oxford, Sir Fulk Greville, and

other gentlemen and townsmen, which repaired thither in greater number than could be ordered. And no marvel it was that so little harm was done, for the fire-balls and squibs cast up did so fly quite over the Castle and into the midst of the town, falling down, some on houses, some in courts and backsides, and some in the street, as far as almost to Saint Mary's Church, to the great peril, or else to the great fear of the inhabitants of this borough, and so as, by what means is not yet known, four houses in the town and suburbs were on fire at once, whereof one had a ball come through both sides, and made a hole as big as a man's head, and did no more harm.

"This fire appeased, it was time to go to rest; and in the next morning it pleased her Majesty to have the poor old man and woman that had their house brent brought unto her; whom, so brought, her Majesty recomforted very much, and by her Grace's bounty and other courtiers, there was given towards their losses that had taken hurt, 25*l.* 12*s.* 8*d.* or thereabouts, which was disposed to them accordingly." A not very large sum for the damage occasioned, but sufficient to mark their sympathy for the suffering and fright occasioned. A recklessness of danger, either to person or property, still characterised the more exciting sports of the time: these mimic fights, the street quarrels of citizens and their 'prentices, foot-ball, were all pursued with an earnestness that too frequently led to fatal results. These have all disappeared by degrees, and perhaps the only one remaining is that of hunting. In the instance above given the inconsiderate rashness with which the exhibition was conducted is far more remarkable than the extent of the mischief that took place.

She afterwards paid another short visit to Kenilworth, thence by Charlecote she went to Lord Compton's at Compton, thence to Berkeley Castle, to Woodstock, Reading, and concluded the progresses for the year, on the 22nd of September, at Windsor.

CURIOSITIES OF BRITISH NATURAL HISTORY.

[Concluded from page 171.]

THE FOX.

From circumstances not fully understood, foxes are subject to various diseases. We learn from Daniel, that they are often affected by the mange; and he mentions an instance in which a brace were killed that had scarcely any fur left upon them, and were so weakened by the disease as to be incapable of even moderate exertion. In 1833, Dr. Weissenborn informs us, an epidemic disease raged among the foxes all over Germany and the neighbouring countries, which in numerous instances terminated in hydrophobia. The subject engaged the attention of the government of Würtemberg; and in 1835 a work 'On the Diseases prevalent among Foxes in our time' was published by Dr. J. Rud. In many instances in which the animals were examined after death, the stomach was found to contain earth, stones, leather, sticks, and also the remains of beetles, and especially the chafer; and to the devouring of these insects was the cause of the disease generally attributed: but, as Dr. Weissenborn thinks, erroneously, the foxes being merely impelled by a morbid appetite, or the weakness to which they were reduced, to subsist chiefly on this description of food, which in general forms only a supplementary part of their diet. Among the instances related of decided hydrophobia, we select the following:—"In November, 1833, a bloodhound belonging to Mr. C. Hanff, of Wilhelmsthal, made a great noise late in the evening, and broke loose from its chain. Her master descended to the yard, tried to calm her, and having fastened her again to the chain, retired to the house, but scarcely had he entered it when the same noise began again. This time Mr. H. discovered the cause of the uproar; for when searching the dog's hut he perceived a fox, which he shot. It being well fed and furred, nobody thought of the possibility of its being mad. However the hound went mad five weeks after, and was killed, as the symptoms of rabies could not be mistaken." "Soon after a fox descended at nightfall from a mountain near Alchenbach, and began to play with a young dog belonging to a labourer, whose cottage is at some distance from the village. It was scared away, but returned the day after. This time the fox made a violent attack on the little dog, worrying it till its master came to its assistance, and beat off the fox. The animal made its escape and did not return; but the dog went mad and bit several other dogs, which were directly shot, and a little boy of the schoolmaster. The boy was subjected to proper and timely treatment, and recovered his health." Many foxes at that time were affected with the mange. In 1836 forty-three dogs in one village were destroyed as a measure of precaution, because a few had been bitten by mad foxes. Among the animals bitten was a horse, which had its nose frightfully lacerated: the fox escaped, as the people present were so frightened that they took to their heels. The horse was apparently healed by a veterinarian. It remained well, and was frequently ridden for seven weeks: it then suddenly became depressed, and at length fell into perfect listlessness and died in dreadful convulsions. Instances even occurred in 1837. In the July number of Behlen's 'Allgemeine Forst und Jagdzeitung' an account is given (communicated by his grace Duke Henry of Würtemberg) of a girl who was bitten by a rabid fox, and died of hydrophobia nine or ten days after the wound had been inflicted.

In all countries the fox is destroyed, but it is in Great Britain only that it is chased for the sake of the excitement produced by hard riding, hair-breadth 'scapes, and the "clamour loud" of the keen-scented hounds which track the footsteps of the fugitive. Poets and prose-writers have alike described the chase as the most animating and most innocent of all sports; for no one pities the fear or pangs of the "felon" whilst he pants for breath on the "lone hill-side," or writhes in silence beneath the mangling jaws of fifty infuriated hounds, each of which singly is more powerful than the animal whose destruction they accomplish. After all, however, the sport is very exciting; the pursuit is arduous—exhausting to man, horse, and dog; and the object of it, worthless as he may be intrinsically, tasks their powers to the uttermost, and not unfrequently escapes.

The fox, when first started, generally, if not always, runs straight forward; and being possessed of good wind, lightness of form, and great muscular strength, often leads the hounds a severe chase. Its long-enduring perseverance has been too often recorded to need much illustration. Foxes have been known to run fifty miles at a stretch; but the most prolonged or one of the most prolonged chases on record was that by the Duke of Richmond's hounds, which, in January, 1739, found the fox at a quarter before eight o'clock, and killed him at ten minutes before six, after ten hours' hard and constant running.

When at length thoroughly deprived of his powers by absolute fatigue, at a time when most other quadrupeds would give way to despair, or yield their lives without a struggle, the fox preserves his self-possession, and puts in practice every expedient which cunning dictates. His endeavour is to baffle the hounds which begin to press him hard: he no longer con-

tinues his course over hill and dale, but makes for the sheep-fold, and, crossing and re-crossing it, hopes to throw the hounds off the scent. He crosses the brook, or wades or swims to a distance down it;—he makes for the nearest human habitation, and darts into the place most likely to conceal him;—he has been known to enter hen-roosts, dairies, stables, barns—to ascend the stairs into a bedroom, or even to rush up a chimney. An eye-witness related to us an instance in which a fox made for a low cottage, ascended the roof, and descended the chimney; the old woman who lived there was out and had locked the door; the hounds came up, and scented the fox within—the whole pack then made one rush at the door, burst it open, killed the fox, and devoured all the bread and other eatables they could find, overturning every chair and table, and throwing all into the greatest confusion, to the old woman's astonishment on her return.

Mr. Egan ('Sporting Anecdotes,' p. 359) relates the following almost incredible instance of the fox's cunning and resolution. According to his account, one of these animals being hard pressed, rushed into the middle of a flock of sheep, instantly killed one, ripped it open, and concealed himself within it. The huntsman and dogs were suddenly all at fault, until, after a quarter of an hour's reconnoitring in every direction, an old staunch hound recovered the scent, and drew Reynard from the strange hiding place which he had selected in his utmost need. A collection of all the anecdotes recorded respecting this animal's contrivances and artfulness would fill a volume.

When overtaken by the hounds, and surrounded on every side, the fox defends himself with desperation to the last, and dies without uttering a cry. A minute description of the external characters of the fox is not here necessary; all are acquainted with the animal. We may, however, state, that it is subject to some little variation in size, being larger and stronger in hilly than in flat districts. The average length of the head and body is two feet four inches; of the tail, or brush, as sportsmen term it, one foot four inches. The general colour is fulvous, with a combination of white and black distributed in different proportions on various parts of the body. The fulvous predominates on the head, back, sides, the posterior parts of the limbs, and the sides of the tail. The shoulders are reddish grey; the throat and chest are grey; the belly, the inner surface of the limbs, the cheeks, the upper lip, and tip of the tail are white; a black mark runs along from the eye to the mouth; the back of the ears and anterior part of the limbs are black. There is a subcaudal gland which produces an offensive secretion. In winter the fur of the fox is fuller and deeper than in summer, and the fulvous becomes grizzled; in old age there is a general grizzled tone over the whole. The senses of sight, smell, and hearing, are in exquisite perfection. The duration of this animal's life is said to be fourteen or fifteen years: this, however, is a statement deduced from individuals in confinement—it is probable that the natural duration of the animal, when wild, extends to a much longer term; but then, how few escape the dangers to which they are exposed! The fox, indeed, holds his life in continual jeopardy, and few ever attain to the natural termination of their existence.

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Ruined Cities and Rapid Vegetation in Yucatan.—On the 15th, at eleven o'clock, we reached the hacienda of Uxmal. It stood in its suit of sombre grey, with cattle-yard, large trees, and tanks, the same as when we left it; but there were no friends of old to welcome us: the Delmonico major domo had gone to Tobasco, and the other had been obliged to leave on account of illness. The mayoral remembered us, but we did not know him; and we determined to pass on and take up our abode immediately in the ruins. Stopping but a few minutes to give directions about the luggage, we mounted again, and in ten minutes, emerging from the wood, came out upon the open field, in which, grand and lofty as when we saw it before, stood the House of the Dwarf; but the first glance showed us that a year had made great changes. The sides of the lofty structure, then bare and naked, were now covered with high grass, bushes, and weeds, and on the top were bushes and young trees twenty feet high. The House of the Nuns was almost smothered, and the whole field was covered with a rank growth of grass and weeds, over which we could barely look as we rode through. The foundations, terraces, and tops of the buildings were overgrown; weeds and vines were rioting and creeping on the façades, and mounds, terraces, and ruins were a mass of destroying verdure. A strong and vigorous nature was struggling for mastery over art, wrapping the city in its suffocating embraces, and burying it from sight. It seemed as if the grave was closing over a friend, and we had arrived barely in time to take our farewell. Amid this mass of desolation, grand and stately as when we left it, stood the Casa del Gobernador, but with all its terraces covered, and separated from us by a mass of impenetrable verdure. On the left of the field was an overgrown milpa, along the edge of which a path led in front of this building. Following this path, we turned the corner of the terrace, and on the farthest side dismounted and tied our horses. The grass and weeds were above our heads, and we could see nothing. The Mayoral broke a way through them, and we reached the foot of the terrace. Working our way over the stones with much toil, we reached the top of the highest terrace. Here, too, the grass and weeds were of the same rank growth. We moved directly to the wall at the east end, and entered the first open door. Here the mayoral wished us to take up our abode, but we knew the localities better than he did, and creeping along the front as close to the wall as possible, cutting some of the bushes and tearing apart and trampling down others, we reached the centre apartment. Here we stopped. Swarms of bats, roused by our approach, fluttered and flew through the long chamber, and passed out at the doors.—*Stephens's Incidents of Travel in Yucatan.*

The Kelp Manufacture in the Orkneys.—During the last war, in consequence of the importation of barilla being interrupted or burdened by high duties, the price of kelp was sometimes 18*l.* and 20*l.* sterling per ton, and the profits of shore proprietors were enormous. Now, from the numerous insular divisions of the Orcadian territories, almost all the proprietors here are possessed of coast, and the manufacture of kelp during the prevalence of the higher prices became an object of vast importance. It is said that small farms of 40*l.* of yearly rent speedily rose to 300*l.*, and large estates attained a proportionate increase of value. When the manufacture was first introduced into Orkney, more than a hundred years ago, the employment being new to the people, was opposed with great vehemence. The subsequent benefits which ere long accrued to the community from the kelp manufacture effected a change in public feeling. The value of coast estates rose so much in value, that attempts were even made, with some success, to cultivate or increase the supply of sea weed by covering sandy bays with stones. By this method, according to Dr. Neill, a crop of fuci may be produced in about three years, the sea itself everywhere abounding with the necessary supply of seeds. Dr. Barry informs us that, for ten years from 1790 to 1800, the quantity of manufactured kelp occasionally amounted to 3000 tons, and as the price was then from 9*l.* to 10*l.* per ton, the annual income from this source alone was sometimes 30,000*l.* sterling. He adds, that in a period of about eighty years from the commencement of the manufacture until the close of last century, the proprietors of these islands, with a land rent not exceeding 8000*l.* a year, have, with their tenants and servants, received, in addition to their ordinary income, the large sum of 595,000*l.* sterling. The kelp manufacture of Orkney, however, has now been entirely destroyed as a remunerating occupation, partly by the reduction of duty on Spanish barilla, an article of superior value for the purpose of making soap and glass, and partly by the almost entire removal of the duty on muriate of soda, or common salt. It may fairly be presumed the fisheries will compensate the disadvantages arising from the loss of kelp, and the sea-ware is still available as manure.—*Wilson's Coasts of Scotland.*



[The Annunciation, from the Baptistery Gates, and Portrait of Ghiberti.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. IX.

THE GATES OF SAN GIOVANNI.

We are now to enter on a view of the progress of painting in the fifteenth century—a period perhaps the most remarkable in the whole history of mankind; distinguished by the most extraordinary mental activity, by rapid improvement in the arts of life, by the first steady advance in philosophical inquiry, by the restoration of classical learning, and by two great events, of which the results lie almost beyond the reach of calculation—the invention of the art of printing, and the discovery of America.

The progressive impulse which characterised this memorable period was felt not less in the fine arts: in painting, the adoption of oils in the mixing of colours, instead of the aqueous and glutinous vehicles formerly used for the purpose, led to some most important results. But long before the general adoption of this and other improvements in the *materials* employed, there had been a strong impulse given to the mental development of art, of which we have to say a few words before we come to treat further of the history and efforts of individual minds.

During the fourteenth century we find all Italy filled with the scholars and imitators of Giotto, but in the fifteenth there was a manifest striving after originality of style; a branching off into particular schools, distinguished by the predominance of some particular characteristic in the mode of treatment:—as expression; form: colour; the tendency to the merely imitative; or the aspiration towards the spiritual and ideal. At this time we begin to hear of the Neapolitan, Umbrian, Bolognese, Venetian, and Paduan schools as distinctly characterised; but from 1400 to 1450 we still find the Tuscan schools in advance of all the rest, in power, invention, fertility, and in the application of knowledge and mechanical means to a given end: and as in the thirteenth century we traced the new influence given to modern art by Giotto back to the sculptor Nicola Pisano, so in the fifteenth century we find the influence of another sculptor, Lorenzo Ghiberti, producing an effect on his contemporaries, more especially his fellow-citizens, which, by developing and perfecting the principles of imitation on which

Giotto had worked, stamped that peculiar character on Florentine art which distinguished it all through the century of which we have now to speak, and the beginning of the next.

For these reasons, the story of Ghiberti, and the casting of the famous gates* of San Giovanni, may be considered as an epoch in the history of painting: we shall find, as we proceed, almost every great name, and every important advance in art, connected with it directly or indirectly, while the competition which is about to take place among our own artists, with a view to the decoration of the houses of Parliament, lends, at the present moment, a particular interest and application to this beautiful anecdote.

Florence, at the period of which we speak, was at the head of all the states of Italy, and at the height of its prosperity. The government was essentially democratic in spirit and form; every class and interest in the state, the aristocracy, the military, merchants, tradesmen, and mechanics, had each a due share of power, and served to balance each other. The family of the Medici, who a century later seized on the sovereignty, were at this time only among the most distinguished citizens, and members of a great mercantile house, at the head of which was Giovanni, the father of Cosmo de' Medici. The trades were divided into guilds or companies, called ARTI, which were represented in the government by twenty-four CONSOLI, or consuls. It was these consuls of the guild of merchants, who, in the year 1401, undertook to erect a second gate or door of bronze to the Baptistery of St. John, which should form a pendant to the first, executed in the preceding century (1330), by Andrea Pisano, from the designs of Giotto, and representing in rich sculpture the various events of the life of St. John the Baptist.* To equal or surpass this beautiful gate, which had been for half a century the admiration of all Italy, was the object proposed, and no expense was to be spared in its attainment.

The *Signoria*, or members of the chief government, acting in conjunction with the *Consoli*, made known their munificent resolve through all Italy, and in consequence, not only the best artists of Florence, but many from other cities, particularly Siena and Bologna, assembled on this occasion. From among a great number, seven were selected by the *Consoli* as worthy to compete for the work, upon terms not merely just, but munificent. Each competitor received, besides his expenses, a fair indemnity for his labour for one year. The subject proposed was the Sacrifice of Isaac, and at the end of the year each artist was required to give in a design, executed in bronze, of the same size as one of the compartments of the old gate, that is, about two feet square.†

There were thirty-four judges, principally artists, some natives of Florence, others strangers; each was obliged to give his vote in public, and to state at the same time the reasons by which his vote was justified. The names of the seven competitors, as given by Vasari, were — Jacopo della Quercia, of Siena; Nicolo d'Arezzo, his pupil; Simon da Colle, celebrated already for his fine workmanship in bronze, from which he was surnamed Simon *dei Bronzi*; Francesco di Valdambrina; Filippo Brunelleschi; Donato, better known as Donatello; and LORENZO GHIBERTI.

Lorenzo was at this time about twenty-three; he was the son of a Florentine named Cione, and of a family which had attained to some distinction in Florence. The mother of Lorenzo, left a widow at an early age, married a worthy man named Bartoluccio, known for his skill as a goldsmith. The goldsmiths of those days were not merely *artisans*, but artists in the high sense of the word; they generally wrought their own designs, consisting of figures and subjects from sacred or classical story, exquisitely chased in relief, or engraved or enamelled on the shrines or chalices used in the church service; or vases, dishes, sword-hilts, and other implements.

The arts of drawing and modelling, then essential to a goldsmith, as well as practical skill in chiselling, and founding and casting metals, were taught to the young Lorenzo by his father-in-law; and his progress was so rapid, that at the age of nineteen or twenty he had already secured to himself the patronage of the Prince Pandolfo Malatesta, Lord of Pesaro, and was employed in the decoration of his palace, when Bartoluccio sent him notice of the terms of the competition for the execution of the gates of San Giovanni. Lorenzo immediately hastened to present himself as one of the competitors, and, on giving evidence of his acquired skill, he was accepted among the elected seven. They had each their workshop and furnace apart, and it is related that most of them jealously kept their designs secret from the rest: but Lorenzo, who had all the modest self-assurance of conscious genius, did not; on the contrary, he listened gratefully to any suggestion or criticism which was offered, admitting his friends and distinguished strangers to his *atelier* while his work was going forward. To this candour he added a persevering courage; for when, after incredible labour, he had completed his models, and made his preparations for casting, some flaw or accident in the process obliged him to begin all over again: he supplied this loss of time by the most unremitting labour, and at the end of the year he was not found behind his competitors. When the seven pieces were exhibited together in public, it was adjudged that the work of Quercia was wanting in delicacy and finish; that that of Valdambrina was confused in composition; that of Simon da Colle well cast, but ill drawn; that of Nicolo d'Arezzo, heavy and ill-proportioned in the figures, though well composed: in short, but three among the number united the various merits of composition, design, and delicacy of workmanship, and were at once preferred before the rest. These three were the work of Brunelleschi, then in his twenty-fifth year; Donatello, then about eighteen; and Lorenzo Ghiberti, not quite twenty-three. The suffrages seemed divided; but after a short pause, and the exchange of a few whispered words, Brunelleschi and Donatello withdrew, generously agreeing and proclaiming aloud that Lorenzo had excelled them all, that to him alone belonged the prize: and this judgment, as honourable to themselves as to their rival, was confirmed amid the acclamations of the assembly.

[To be continued.]

* A Baptistery, as its name imports, is an edifice used for the purposes of baptism, and always dedicated to St. John the Baptist. The Baptistery of San Giovanni at Florence is a large chapel of an octangular form, surmounted by a dome: on three of the sides are entrances. It is an appendage of the cathedral, though separate from it.

† The peculiar form of the compartment may be seen in the engraving at the head of this essay.

THE PUNA AND THE MINES OF LA RIOJA.

[From the Narrative of J. O. French, Esq., in the Geographical Journal.]

THE climate of the Morado is mild in comparison with that of the other great central elevations of the chain, both in respect to cold, and to the still more important circumstance of the *puna*, of which I shall presently speak. One almost continuous elevation, called the Rosario, connects the Morado and the Cerro Negro and Cerro Cienega; between these and the Nevado lie the ranges severally called the Valletos, the Tigre, and

the Mexicana: the latter is perhaps within 300 feet of the height of the Nevado itself; the summits of the Cerro Negro, Morado, some part of the Valletos and the Tigre nearly equal in height that of the Mexicana. Ascending the great northern quebrada, termed the Escaleras, or ladder, from its long-continued ascent by ravines and terraces, to the bases of the central elevations, a distance of 12 leagues from the trapeche or mill of the Escaleras is traversed. The region of lichens and mosses is finally arrived at in the upper ravines; and here the central elevations rise steeply, and often inaccessibly, from 700 to 800 or 1500 feet This is the region of the condors, which, when glutted with the carcass of some dead mule, may be easily approached. Here also I observed a small active quadruped resembling the fox, scaling the rocks above the region of vegetation. At the northern edge of the Valletos occurs the *Cueva de Perez*, whence a ravine branches off to the right to the base of the Mexicana, which here presents a broad and very steep face, about 1000 feet in height, on which huts and entrances to mines may be seen at various elevations. A little way up the ravine from the cave some ancient Indian mining works exist; and here the *puna* begins to be sensibly felt, increasing as the ravine is ascended. At the entrance of this northern gorge of the Famatina mountains, near the Escaleras mill, long dikes, piled up, of smooth, rounded, bright granite stones, and flat beds of similar stones and boulders, alternating with patches of sand, exhibit striking evidences of the force of aqueous action. Farther in the ascent the features of the scene are on a grand scale. A mountain stream, from fifteen to fifty feet wide, and from two to four deep, descends through this section of the mountains to the mill of the Escaleras, and is several times crossed in the ascent; it then flows into the valley below, and irrigates the district of Famatina already described. The pass of the Escaleras is generally impassable during the winter months of June and July, the stream frozen, and the ravines blocked with snow and ice. I, however, succeeded, in the comparatively milder winter of 1826, though not without difficulty, in ascending by this route and gaining the summit of the Mexicana, having passed a night in the Cueva de Perez blocked round with snow during one of those terrific storms so common in these elevated ranges. Their approach is well known to the miners, from the gathering of masses of small dark clouds sweeping eastward over the Nevado; the arriero with his mules, to or from the mines, then hastens to gain shelter in the huts above or in the deep ravine beneath. These storms come always from the westward or south-westward: they sweep the ravines with furious gusts, which are succeeded by sudden momentary calms: they are generally confined to the upper regions of the mountains, without being felt at all in the valley of Famatina, where the weather may be serene and fine. The roofs of the low massive huts at the mines on the hill side, notwithstanding their being heavily laden with large stones, are sometimes blown away. In this remote and stormy region the poor miners lead a wretched existence: the spirit of gain, however, seems to set all difficulties at defiance. The highest part of the summit of the Mexicana, forming a point slightly elevated above the rest, called the *Espina*, is cut by a vein of silver-ore, which for several years has yielded a profit to its proprietor, D. Simon Herera, although worked at enormous expense. About seventy men were engaged in the working of this mine, and reducing the ores by amalgamation at the trapeche of Escaleras, distant forty miles from the mine. Another vein in the same elevation has been profitably worked by Senor Goriti; and there is also another mine, which has been badly worked, in which considerable quantities of rich ore are exposed to sight in the vein. The ore of this elevation is a black or greyish-black earthy sulphuret of silver, either pure, or more or less dispersed in a quartzose and hornstone gangue, and containing a proportion of gold sufficient to give the silver produced a yellow tinge. The average produce of the silver is 80 marks the cajon of 50 quintals from the mine of Santo Tomas in the *Espina* above mentioned. The other mines of this elevation yield an average from forty to fifty marks, with the exception of that of D. Isidore Carbajal, which yielded twenty-five marks. There is probably considerable waste in the reduction of the ores. An assay, by a skilful German assayer, of some of the *relaves*, or refuse of Santo Tomas, which had undergone amalgamation at the trapeche of the Escaleras, yielded in the ratio of thirty marks the cajon. The ores of this mine became latterly interrupted by a bed of pyrites. The veins of the Mexicana dip to the N.E. at an angle of about 70° to 75°; the dip of the veins in the other elevations ranges between 50° and 80°. The inclemency of this region of the Mexicana is excessive; so much so, that the endurance even of the Indian is put to the test. The other elevations more remote from the Nevado are more tolerable, the Morado being the mildest. Pleurisy often occurs, and the victim not unfrequently dies on the route during his conveyance to the valley. "*Padecemos, mas sufrimos*,"—"We suffer, but we endure," was their reply to my question respecting the climate of this region. This inclemency is, however, not attributable to the degree of cold merely, but to the increased nervous sensibility occasioned by the action of the puna affecting both the respiration and digestion, and rendering the cold less endurable. The puna is produced not altogether by atmospheric tenuity, although its action may be aided by this circumstance, since it occurs in widely different degrees at similar altitudes in these mountains. In the Morado its effects are comparatively slight—in the Mexicana extreme, although the altitudes differ little or nothing in relation to this phenomenon, which, I have little doubt, arises from certain mineral exhalations. This circumstance may account for some travellers having denied or thrown doubt upon its existence (vide Miers and others), while others relate of it the most startling examples (vide Miller's *Memoirs*, and the older voyagers in South America). The puna is not to be mistaken: it ordinarily produces a sense of weight in the head and limbs, hinders the progress of the pedestrian, as if his heels were lead, and sets him panting at a common walk, as if he were running a race: when considerable, it produces headache and nausea; when extreme, vertigo and vomiting. The complexion of the flesh-coloured European changes to a livid bluish tint: that of the Indian to a cadaverous yellow. In the Himalaya mountains a similar effect has been noticed; the cause is probably identical. The Mexicana exhales profusely sulphurous and other vapours: the clothes of the visitor at the mines become saturated with the effluvia, and it is probably as much owing to the puna as to any other natural obstacles that the Nevado is as yet unexplored, although conjectured to be rich in the precious metals. I suffered severely from passing a night in a low hut, half filled with snow, near the summit of the Mexicana, with nothing but my saddle and its usual accompaniments, and a blanket for my bed, although the previous night I had slept on the rocks of the lower summits in the pass of Santa Rosa in the open air, with snow around me, with but little inconvenience comparatively—so much more inclement was the Mexicana. On this account no native visits it from mere curiosity.



[illegible]

CASTES AND TRIBES OF INDIA.

In the latter half of the seventeenth century, in the reign of Aurungzebe, the last powerful and energetic monarch who ruled over the Mogul empire in Hindustan, there descended from the range of inaccessible hills which runs along the western coast of India fierce and wild bands of plunderers, whose devastating excursions spread dismay among the inhabitants of the neighbouring plains. They were the descendants of the Rajapoots, an old warlike tribe, who being driven by the Moguls from the provinces of Hindustan fled to the mountains of Western India. Inured to hardship, accustomed to the poorest fare, and armed with excellent sabres, they formed, like the Cossacks, with their hardy horses a formidable cavalry, which was the terror of the neighbouring provinces. They were educated for war, and in battle intoxicated themselves with wild hemp, which they smoked like tobacco. In our recent contests with them their artillery was skilfully managed. The Mogul dynasty, after a brilliant existence of little more than a century and a half, was fast sinking into a state of paralysis and corruption, and these freebooters flocked like vultures round the expiring body. As they were Hindus, and professed the religion of Brahma, their standard had attractions for the patriotic as well as the greedy, and the Mohammedan power soon learned to tremble at their boldness and energy. Not being able in the early period of their power to maintain themselves in the countries which they ravaged, they laid them under contribution, and for a fixed proportion of their revenues, exempted them from further incursions. This also gave them an opportunity of extending their devastations to new provinces, while the growing weakness of the Mogul empire rendered it incapable of protecting itself against a power which was destined to be one of the chief instruments of its destruction. When Aurungzebe attacked the Concan and conquered the inhabitants, called in the Mahrattas, [illegible] into a treaty very unfavourable to them; for though at one time he frequently defeated them in the plains, his efforts were ineffectual to rout them from their strongholds in the mountains. Sevagee, who may be considered as the founder of the Mahratta empire, having united the various tribes of which the nation was composed into a monarchy, died in 1682, and Aurungzebe put his son to a cruel death a few years after; and Aurungzebe himself died in 1707, when the Mogul dominion declined with frightful rapidity. The Mahrattas now extended their territories, their original country, though large, being wild and uncultivated. The capital of Sevagee's new kingdom was Sattarah. From robbers the Mahrattas became conquerors. The successor of Sevagee assumed the title of Maharajah, grand prince. "Half the provinces of the empire," says Mr. Macaulay ('Edinburgh Review'), "were turned into Mahratta principalities. Freebooters, sprung from low castes and accustomed to menial employments, became mighty rajahs. The Bonsla, at the head of a band of plunderers, occupied the vast region of Berar. The Guicowar, which is, being interpreted, the Herdsman, founded that dynasty which still reigns in Guzerat. The houses of Scindia and Holkar waxed great in Malwa. One adventurous captain made his nest on the impregnable rock of Gooti. Another became the lord of the thousand villages which are scattered among the green rice-fields of Tanjore."

Full of energy and audacity, bold, politic, and cunning, the Mahrattas had all the qualities which rendered them formidable to a power hourly decaying and becoming more imbecile. They gloried in rapid flight as well as in bold daring, and did not hesitate to

invite robbers and plunderers of all kinds to their standard. The real Mahratta possessed, however, in spite of a cruel and relentless disposition, a manly simplicity of character, which was generally retained even when fortune had raised him to the highest rank. His [illegible] under privation in the field was [illegible] exceeded by his policy in the arts of dealing with men. At first the Mahratta conciliated the proud and paid respect to the prejudices of the ignorant by affecting a sense of inferiority in the provinces which they had despoiled and of which they were the real masters. In the height of their power their provinces stretched across the peninsula from sea to sea. We again quote the forcible language of Mr. Macaulay:—"Their captains," he says, "reigned at Poonah, at Gualior, in Guzerat, in Berar, and in Tanjore. Nor did they, though they had become conquerors, therefore cease [illegible] freebooters. They still retained the predatory habits of their forefathers. Every region which was not subject to their rule was wasted by their incursions. Wherever their kettle-drums were heard, the peasant threw his bag of rice on his shoulder, hid his small earnings in his girdle, and fled with his wife and children to the mountains or the jungles, to the milder [illegible] the hyena and the tiger. Many provinces redeemed their harvests by the payment of an annual ransom. Even the wretched phantom who [illegible] the imperial title stooped to pay this ignominious [illegible]. The camp-fires of one rapacious [illegible] the walls of the palace of Delhi. [illegible] cavalry de[illegible] fields of Bengal [illegible] a hundred years [illegible] Calcutta [illegible] the horsemen of [illegible] the name of the Mahratta ditch still pre[illegible] the [illegible]. The formidable [illegible] Mahratta [illegible] 1817 [illegible]

On the death of [illegible] the [illegible] of the Mahratta [illegible] the nominal sove[illegible] while the government was administered [illegible] or minister residing at Poonah, who held [illegible] prisoners, and in whose family the office had become hereditary. The following concise synopsis of Mahratta history from this date, founded [illegible] Duff's 'History of the Mahrattas,' is taken from an article in the 'Encyclopædia Americana:'—

The last of the royal family, Ram Rajah, ascended the throne at the age of eight years. His prime minister, the peishwah (grand vizier) Bajeerow, took advantage of the minority of the prince, seized the reins of government with the aid of Rajoojee, another minister, and confined Ram Rajah, who remained a prisoner till his death in 1777, though he left him a show of dignity. Bajeerow, with the other minister, then proceeded to divide the territories as independent sovereigns, the former assuming the western provinces and fixing his residence at Poonah. His kingdom was called the empire of the Poonah-Mahrattas. Rajoojee took the eastern provinces, established his court at Nagpour, and founded the empire of the Berar Mahrattas. Bajeerow died in 1761. The dignity of peishwah was hereditary in his family. But a council of government was formed in 1777, consisting of twelve Brahmins, which left the peishwah nothing but the executive power. This division of the Mahratta states could not be effected without the consent of the principal governors of the separate states; they were gained by additions of power and revenue. Hence many Mahratta princes arose, some of whom were only in appearance dependent upon the sovereigns of the more extensive districts, much as the German princes anciently depended on the emperor.—1. The empire of the Poonah-Mahrattas comprehended the whole coast from Goa to Cambay, and was surrounded by Mysore, Golconda, Berar, and the Mahratta principalities, Guzerat, Ojein, and Indore. It contains the most important possessions of the Bombay presidency. Bajeerow defeated the Mussulmans in 1760, and extended his conquests to the banks of the Indus. This brought the Poonah-Mahrattas in contact with the territory under Abdallah, formerly a general of Nadir Shah. The peishwah having formed a plan for driving the Mohammedans out of the country, and extending the dominion of the Mahrattas over all India, the whole country was divided (1759-61) into two parties. The Mohammedans adhered to Abdallah, and appeared 150,000 strong in the plains of Carnaul and Panniput; the Mahrattas, together with the Jats, were 200,000 strong. After a long and bloody battle the latter were defeated, and lost all hopes of the supremacy over India, which had been the object of the war. Bajeerow died soon after. His son Madarow died in 1772; his grandson Narain Row was assassinated in 1773 by his uncle Ragobah. The latter could not, however, obtain quiet possession of the peishwahship, for a posthumous child of Narain was acknowledged for his lawful son. Ragobah offered to the English the island of Salsette, on condition that they should support his claims. But the council of Bengal was unwilling to engage in a w[illegible] with the Mahrattas, and in 1766 concluded a treaty, by the terms of which Ragobah relinquished his pretension; the English were to remain in possession of Salsette, and to receive a territory producing a yearly revenue of three lacs of rupees. Ragobah remained at Bombay. The English maintained that the district ceded to them did not yield the sum agreed upon. The friends of Ragobah had defeated the adherents of the young peishwah at Poonah, and the government of Bombay, with the consent of the council of Bengal, sent Ragobah in 1778 with an English army to Poonah. The English gained many important advantages, but on account of their war with Hyder Ali peace was their chief object. It was concluded in 178[illegible]. They received all the conquered countries except Salsette and the neighbouring islands. Madarow, the son of Narain Row, who had been assassinated, was born in 1774, and in 1783 declared peishwah, and was for a time under the guardianship of one of the other Mahratta princes. Bajeerow, the last peishwah, was established by an English force under the command of General Wellesley, now Duke of Wellington, [illegible] of the Mahratta tribes with the [illegible] British armies; but in 1817 he commenced [illegible] against the English. He was, however, [illegible] handled (November 16) by General Smith, that he abandoned his residence at Poonah, and fled to a mountain fortress. In 1818 he submitted to the British authority, and lived as a private individual, with a yearly pension, under the British [illegible]. 2. The state of the Berar Mahrattas was not so deeply involved in foreign wars, but suffered more from domestic disturbances. Berar, the chief province, is two hundred miles long and one hundred and seventy broad. Rajoojee, some years after his expeditions with the peishwah against Bengal, wrested the best part of Orissa from Aliverdy, the nabob of Bengal. A [illegible] low stream only separated the Berar Mahrattas from Bengal, and they often made incursions into the frontier provinces of that beautiful region. The devastations were not checked until after Cossim Aly, nabob of Bengal, had ceded (1761) Burdwan and Midnapore to the English. Rajoojee, the first Berar rajah, after a long reign, left four sons. The eldest succeeded his

father, but died without children. The two next, Sebagee and Modagee, engaged in a war for the succession, in which the former fell, and the latter became rajah. He also assisted the Poonah-Mahrattas in the war against the British (1817), at first privately, but afterwards openly, and was obliged to submit, and to cede to the English his fortresses. Of the remaining Mahratta princes, the most important were Sindia and Holkar. The former was rajah of Oojein, and had become very powerful. To limit his growing power, war was declared against him by the British, in 1802, and he was defeated by the Duke of Wellington (then General Wellesley), September 23rd, 1803. He was obliged to consent to a disadvantageous peace, which was afterwards often violated. He died in 1827. Holkar, sovereign of Indore, whose revenue was estimated at 4,500,000*l.* sterling, was alternately the friend and enemy of the English. In the war of 1805 he was compelled to submit to disadvantageous terms. In 1817 he again took arms, but was defeated and obliged to submit, and deprived of two-thirds of his territories. He died in 1825.

"The subjugation of the Mahratta states was facilitated by the circumstance that the military caste of the rajahs was universally hated, because they treated the other castes as slaves. The property and rights of the latter found protection only under the British dominion. The caste of warriors left the British provinces in consequence, formed banditti (Pindarees) on the Nerbudda, and sought protection from the small Mahratta princes, who were jealous of the British."

The populations which the Mahrattas once scared live now in peace under the benignant sway of Britain.

LOCOMOTION OF ANIMALS.—No. I.

The constitution of a vast assemblage of animals requires that they should possess the power of moving from place to place in search of food, and for a multitude of other objects incidental to their sphere of action.

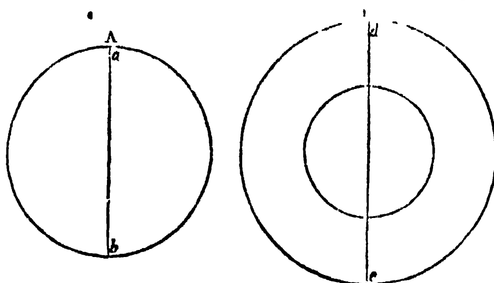
It is probable that most persons observe the ease with which animals traverse the earth, air, or sea, without bestowing the slightest reflection on the diversity of locomotive organs with which they are endowed in order to perform their several kinds of movements, or on the mechanical principles to which they are subordinate. We propose an inquiry into this subject, and commence by a brief exposition of the structure and mode of action of the locomotive organs of animals which move on solids.

It is requisite that the framework of animals which are destined to move on the earth should be more dense, and possess greater strength, to enable them to bear the shocks incidental to terrestrial progression, than that of those species which move in air, or water. The bony framework of the higher orders of animals, such as man and other mammalia, is composed of a great number of pieces which are hinged together at the joints in such a manner as to allow of more or less mobility, according to the purposes they are intended to fulfil. Thus, the legs and arms are united to the trunk by a ball-and-socket joint, a species of union permitting the greatest possible freedom of motion. The knee, elbow, and ankle, on the contrary, are furnished with the hinge-joint, which admits of motion backward and forward in one plane only; but, although the movements of these joints are thus in some measure restricted, greater precision is secured.

The vertebral column, which comprehends the bones of the back, is composed of a long chain of bones, acting as a flexible lever to support the head, neck, and trunk, and forming the connecting link between the several parts of the body. For this purpose, the movements of each of the several bones of the back upon each other are restricted; but, in consequence of the great number of joints with which the spinal column in man is furnished, it has a considerable degree of motion. The extremities of those bones which terminate in joints are tipped with a very hard, smooth, pearly-white, opaque substance, termed cartilage, lined with a delicate thin membrane, called the synovial membrane, which secretes an oily fluid into the joints, so that the limbs, in their movements upon each other, are protected from friction throughout the life of the animal.

The elastic cords which bind the bones together at their joints are termed ligaments, and such is their strength, that bones are often broken without the connected ligaments being torn or injured.

The long bones, which support the trunk of an animal above the surface on which it moves, are hollow cylinders, a form which presents a longer surface for the attachment of the muscles by which the limbs are moved, and confers greater strength with less expenditure and weight of material than if they were solid. It is found that the lateral strength of two cylindrical bones of equal weight and length, one of which is solid, and the other hollow, are to each other as the diameter of their transverse sections. For instance—let a, b, d, e, figs. A, B, represent the figures of the two bones; then, the strength of the tube $d\,e$ is to that of the solid $a\,b$ as the length of the diameter $d\,e$ to that of $a\,b$. In consequence

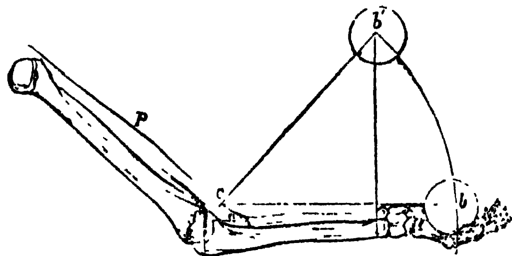


of this principle it was long since observed by Galileo that the strength of bodies is augmented in a thousand ways without increasing their weight; and that if a wheat-straw, which supports the ear which is heavier than the whole stalk, were made of the same quantity of matter, but solid, it would break or bend with far greater ease than is now found to be the case. The feathers of birds present, as well as the bones of animals, similar provision for the combination of strength, lightness, and economy of material. It must, however, be borne in mind that neither the strength of bodies nor the size of animals can be increased with the same quantity of matter without limit; because when the diameter of the tube exceeds certain dimensions, it becomes so thin and fragile as to break without offering any sensible resistance.

The bones, ligaments, and joints of animals are denominated the *passive*, and the muscles the *active* organs of motion. The bones serve the purpose of levers, which are acted upon after the principle of what is called the first, second, and third orders of lever, so named according to the relative positions of the prop or fulcrum, the power, and the resistance or weight.

The power of the muscles which move the limbs is so great that if the resistance to their action be sufficiently strong, they are often known to break the bones upon which they act. It is in consequence of the great force which the muscles are capable of exerting that

they are generally attached to the bones very near the axis of the joint about which the bone moves. The advantage of this disposition is, that a greater power of the muscle is made equivalent to a greater velocity in the movement of the limb. The action of the biceps muscle affords a good example of this principle. In the annexed figure we observe that this muscle *p* is attached to the bone of the fore-arm at *a*, very near the axis of the elbow-joint *f*, the effect of which is that in raising the weight in the hand *b* to *b'*, the muscle moves the point *a* only to *c*; but then, as the distance between *b* and *b'* is much greater than the distance from *a* to *c*, it is manifest that a very small contraction of the muscle is sufficient to produce a very great range in the movement of the extremity of the limb.



In this case the muscle is acting under a mechanical disadvantage owing to the obliquity of its direction, and its proximity to the joint; but, as it is endowed with great power, these circumstances do not constitute defects. On the contrary, not only can the limbs be moved upon each other with much more velocity, but the symmetry and beauty of proportion in the human figure are preserved. It is moreover said that a muscle cannot contract upon itself beyond about one-fourth of its entire length; so that its work must of necessity be done by acting in some such manner as we find in the case already mentioned.

As the muscles have the power of contracting throughout nearly their whole length, they are capable of drawing the moveable parts attached to them at both their ends; for example, we can, with the same set of muscles, either bend the thigh upon the body, or the body upon the thigh. If the muscles had not been endowed with the power to move the limbs under a mechanical disadvantage with the velocity they do, the sledge and the hammer, now so daily in use, would have been instruments of no value to the smith, nor the axe and hammer to the carpenter; and the numberless uses to which rapid motions of the limbs are applied must have been effected by some other means. The figure of the arm affords an illustration of the principles of the third order of lever; that is, the *power* of the muscle is applied between the *weight b* and the fulcrum *f*; and the power of the muscle *p* is to the weight *b*, as the length of the line *bf* to the length of the line *fc*: from this proportion we can readily find the power of the muscle when the weight is known.

THE HILL AND CASTLE AT NOTTINGHAM.

A TRAVELLER who passes along the Midland Counties Railway from Derby to Nottingham, when he approaches the last-named town cannot fail to see the abrupt and conspicuous hill which forms a kind of landmark on the south-west side of the town. This hill, or rather rock, rises almost perpendicularly from the northern bank of the little river Leen, and is surmounted by what was once Nottingham Castle. But it must be confessed that this castle, whether seen in its present ruinous state, or as it was a dozen years ago, does not and did not convey the idea which we are wont to attach to the word 'Castle.' When the history of a town goes back to times beyond the Conquest, and includes recitals of how this and that monarch defended himself in the Castle attached to it, we are apt to conjure up visions of a venerable embattled structure, majestic even in its ruins, with fragments of a 'keep' or 'donjon' in one place, a 'curtain' in another, and so forth; but the Nottingham Castle of our days is a Grecian structure.

If, leaving the market-place of Nottingham, we walk south-westward towards the Castle, we first encounter the entrance gates, the veritable gates of the old castle, which still remain standing in spite of the vicissitudes which the castle itself has undergone. Before entering these gates (which form the only adit to the summit of the rock), a walk of a few hundred yards will carry us entirely round the base of the rock on which the castle stands. This rock is perpendicular, or nearly so, only on the side next to the river: on the opposite side it slopes down gradually to the level of the town; and on the easiest part of this slope are the entrance-gates. When, proceeding to the left, we make the circuit of the rock, we meet with many small streets and lanes, whose names (as we shall see presently) bear testimony to some of the historical events for which the castle has been noted; such as "Edward," "Mortimer," "Isabella," &c. Then, coming down to the banks of the little river, we find the rock on the opposite side becoming more and more steep, until it at length appears nearly perpendicular. Many rooms and small houses have been built on the face of the rock itself, by excavating the scarped part; and above may be seen the castle at a height of some two hundred feet. Passing onward, we meet with a collection of small gardens, occupying a spot of ground, once the moat or fosse of the castle, afterwards a fish-pond, but now producing an annual rental to the "lord of the castle," from the towns-people who hold the gardens. This is the lowest part of the circuit; and a little ascent brings us (always skirting near the base of the rock) to the road leading from Nottingham to Lenton. A portion of this road has been carried by a cutting through the rock on which the castle stands, so as to give to the latter an appearance of isolation more complete than would otherwise be the case. Shortly after this we reach the spot whence we started, near "Standard Hill," after having made the circuit of the castle and its rock.

The old gate of the castle is occupied by persons who conduct visitors, on the payment of a small fee. Within the gates is a grass-plot or court, once probably the outer quadrangle of the castle; and having crossed this, we ascend a flight of steps leading up to the terrace which surrounds the castle, and on the level of which it stands. Here, glancing upwards at the bare and blackened walls and windows, and within at the heaps of stones, we witness a sad memorial of the mischief which an ungoverned multitude has effected. When we approach that side of the terrace which is nearest to the scarped cliff, we obtain an extensive and really beautiful view of the country around. All the south-west parts of the town lie spread out before us; with their factories, the railway, the little river Leen, the canal, the Trent at a small distance, the villages of Radford and Lenton, the gardens occupying the *ci-devant* moat and fish-pond below, and the blue outline of the Derbyshire hills in the distance.

We are told by the local historians, that the name of Nottingham has been derived from "Snottinga-ham," or "Snodengaham," signifying in the original Saxon the "place of caverns;" in relation, as is supposed, to numerous caverns and subterraneous dwellings excavated in the sandy rock on which it was situated.

According to the Saxon chronicle, the Danes, having in one of their numerous predatory incursions made themselves masters of the town, in 868, were attacked by Burhred king of Mercia, who, having obtained the assistance of King Ethelred I and his brother Alfred, afterwards Alfred the Great, compelled the invaders to conclude a treaty of peace and to retire to York. Subsequent disasters of a similar kind led to the fortification of the town by means of a wall, by Edward the Elder about the beginning of the tenth century. Some fragments of this wall are said to be still visible on the side of the hill above Narrow Marsh.

In the time of the Conqueror, when the town of Nottingham was found to contain one hundred and twenty burgesses, a castle was built on the summit of the hill, on the site of what had been an ancient fort; this castle was to overawe the townspeople, and was given to William Peveril, a natural son of William. From the strength of its structure and the boldness of its position the castle was for some time deemed impregnable; but during the wars between Stephen and Matilda it was taken by the Earl of Gloucester, who at the same time plundered and burnt the town; and under the reign of John, it was unsuccessfully attacked by the confederate barons.

The reign of Edward III brings us to the period which has given an interest to the rock itself as well as to the castle which stood on it. When we are on the terrace of the (present) castle, we find a small and nearly concealed flight of steps leading down to subterranean passages through the body of the rock. These passages have a very curious appearance, cut in a kind of sandstone which constitutes the hill; their sides and floor have a good deal crumbled away, and what were once steps is now only an irregular inclined plane. The passages wind in various directions, always descending, and are lighted here and there by irregular loop-holes cut in the surface of the rock. Along the sides of the passages in some parts are hemispherical cavities, said by the attendant *cicerone* to have been excavated to contain the cannon-balls stored away for the use of the defenders of the castle in disturbed times; with what correctness we cannot say. Some of the passages are now blocked up, either designedly or by the falling down of sandstone fragments from the roof and sides; but there can be no doubt that they led down originally nearly or quite to the level of the little river beneath; and it is a safe conclusion that they were formed artificially as a secret exit from the castle, in accordance with the crafty and cautious arrangements of disturbed periods.

This subterranean passage (being named "Mortimer's Hole") which points to the occurrence connected with its history. How Edward II was murdered in Berkeley Castle by the machinations of his queen Isabella, and her paramour Mortimer, is familiar to all who have read English history; nor is it necessary to detail the struggle which the guilty pair had to maintain against the youthful monarch Edward III and his supporters. Suffice it to say that on October 20th, 1330, the young king, together with Isabella and Mortimer, were in Nottingham Castle, and that the king's partisans had resolved to seize forcibly on Mortimer, who had wrought such mischief in the country. The result is related by Hume, but rather more in detail by Lingard, as follows:—"Mortimer had taken every precaution for his security. A strong guard lay within the walls, the locks of the gates were changed, and the keys were taken every evening to the queen's chamber, and laid on her pillow. Montacute (one of the king's party) found it necessary to make a confidant of Sir William Eland, the governor, whom he first swore to secrecy, and then acquainted with the royal pleasure. Eland replied that there was a subterraneous passage, leading from the west side of the rock into the Castle, which was unknown to Mortimer, and through which he would introduce any number of the king's friends. Montacute, with his associates, fixed the hour and rode into the country; and the favourite, who had received some dark hints of a conspiracy against him, attributed their departure to an apprehension that their design had been discovered. In the afternoon he informed the council that an attempt to oppress him and the queen mother would soon be made by the exiles abroad in union with Edward's most intimate acquaintance at home. He even charged the king with being privy to the plot, and refused to give credit to his denial. Before midnight Montacute and his friends returned; Eland admitted them by the subterraneous passage, and they were joined by Edward in the same, leading to the principal tower. They mounted in silence till they heard the sound of voices in a room adjoining to Isabella's apartment, where Mortimer was engaged in consultation with the Bishop of Lincoln and his principal advisers. The door was instantly forced, and two knights who endeavoured to defend the entrance were slain. The queen, alarmed by the noise, and conjecturing its cause, exclaimed 'Sweet son, fair son, spare my gentle Mortimer!' But her fears would not permit her to remain in bed. She burst into the room crying out that they might spare her dearest friend, her well-beloved cousin. It was, however, in vain. Mortimer was captured, tried for high treason, and executed."

Nottingham Castle from time to time occupies a place in the history of the subsequent reigns sufficient to indicate its continued existence. Thus we find that in Edward III's reign a parliament was held here; that David Bruce, who had been made prisoner at the battle of Durham, was for some time confined in the castle previous to his removal to London; that in 1386 a council was held here by Richard II which led to violent disputes between the ministers and the parliament; that in 1461, Edward IV, after landing at Ravenspur, assembled his forces at Nottingham, and made extensive additions to the castle; that Richard III further improved the castle, and marched thence with his forces to Bosworth Field; and that Henry VII held a council of war here previously to the battle of Stoke.

In Charles I's reign, when the contest between the king and the parliament commenced, Charles set up his standard on a hill within the limits of Nottingham Castle. Just without the present boundary of the castle grounds there is an inhabited street or terrace called Standard Hill, which marks the spot where this occurrence took place. All the particulars of this planting of the royal standard are given with more than sufficient minuteness in a pamphlet published at the time under the title of 'A true and exact Relation of the Manner of his Majestie's Setting up of his Standard at Nottingham, on Munday the 22 of August, 1642.' Some time afterwards the castle was taken by the Parliamentarians, and during the Protectorate it was dismantled and almost demolished. After the Restoration it passed into the Duke of Buckingham's hands, and from him to the Duke of Newcastle, who pulled down the remains of the castle, and built the mansion whose deserted walls now meet the eye. The time for intestine wars was passed, and the duke substituted a private mansion for a military castle. It was at this mansion that, in 1688, the Earl of Devonshire and other noblemen met to concert measures for the support of the Prince of Orange. The building was nearly destroyed in 1831 by a mob, and as it was left after that tumult, so it remains to the present day.

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MOUNT VESUVIUS.

A full account of Vesuvius has already been given in the Penny Magazine (Nos. 13 and 14, vol. i.) by a writer who was an eye-witness of the great eruption of 1822, which he has described. On the present occasion, therefore, we shall enter a little more generally upon the nature of volcanoes. The connexion of earthquakes with volcanic eruptions, and of different volcanic regions with each other—the rising of new islands out of the sea, and the elevation of new mountains—each the effect of the same disturbing causes operating by a mighty power in the interior of our globe, impress the mind more powerfully than any other physical phenomena. They are connected too with the very foundation of the world, and hence it is impossible to regard them without intense interest. The history of Ætna goes back to a period antecedent to the Christian era, at which period ancient writers state that Vesuvius had many signs of having been burning in the olden time, though the first recorded eruption is that which took place in A.D. 79. On the banks of the Rhine, in Hungary, and in Auvergne are to be seen distinct traces of volcanic fires which occurred long before the origin of history.

Previous to volcanic eruptions the vicinity of the centre of future violence is disturbed by earthquakes often for a considerable period, the district affected being more or less extensive. Sometimes new volcanoes are formed at a great distance from older ones, as, in 1759, on the plains west of Mexico, when the volcano of Jorullo was formed by the swelling up of the ground in the shape of a bladder, the accumulation [illegible] afterwards raising it into a mountain 1600 feet high. While volcanoes are thus a consequence of earthquakes, the latter phenomena are produced by a disturbance in the equilibrium of forces within the bowels of the earth. The general type of volcanic eruptions appears to be as follows:—the ground is rocked by frequent earthquakes, special movements and noises happen in and about the volcanic mountain, clouds of steam rise from the crater, followed and mixed with showers of ashes and cinders driven up by the exploding vapour and expanding gases; the tube of the crater becomes filled by melted matter, which undulates upward and downward with the irregular pressure of the steam and gases; these burst in large bubbles through it, scattering it into granular dust and ashes, till the lava overtops or breaks through the loose conical walls of the crater, and flows abundantly, so as partially or wholly to relieve for a time the unbalanced internal pressure. That steam is the moving force of the eruptive power there can be no doubt. Water admitted into the hot interior parts of the earth is quite adequate to account for any eruptive force witnessed in volcanoes. The most active volcanoes are generally near the sea-shore, or considerable bodies of water, and aqueous vapour or steam and ashes are generally to be observed in the ejections. The matter ejected from Vesuvius is believed to be raised nearly a mile in height, reckoning from the bowels of the mountain, and a pressure

of between three and four hundred atmospheres would be of sufficient power to effect this. Now the ejected lava has been known to melt silver, and to be equal in heat to red-hot iron, and capable of heating steam to a pressure of a thousand atmospheres.

Dr. Daubeny's chemical theory of volcanoes is, that sea-water, and afterwards atmospheric air, being admitted to considerable masses, at a moderate depth below the surface of the earth, an abundant decomposition of metals, metalloids, sulphur, and water takes place. These views have been disputed by several eminent writers. The geologist unites to these chemical causes others which have reference to the connexion and reciprocal activity which exists underground between volcanic regions having apparently no connexion with each other, as between Sicily and Naples; and he adduces, besides, evidences of volcanic action to be found on the surface. The immediate centre of volcanic eruptions, around which the scoriæ and lava are dispersed, constitute a mere point in comparison with the area under which the subterranean causes of the volcano may be continuously at work. This space, says Mr. Lyell, is "convulsed from time to time by earthquakes; gaseous vapours, especially carbonic acid gas, are disengaged plentifully from the soil; springs often issue at a very high temperature, and their waters are generally impregnated with the same mineral-waters as are discharged by volcanoes during eruptions."

The general theory of volcanic action, according to the article "Volcano," in the 'Penny Cyclopædia,' seems in substance to be as follows:—The earth's crust is subject to fractures, and has always been subject to fractures on a great scale: below the surface of the earth is now, and was in ancient geological periods, an internal sea of molten rock; this sea is agitated and thrown bodily from its place by the rending of the strata; *a wave of translation* (not an ordinary undulation) is generated in the liquid mass, which passes rapidly upwards and moves the land on its crest in a given direction: this is the earthquake. A portion of the melted rock is forced by the general pressure into cavities of the rocks, or spread out in irregular sheets on the bed of the sea; these are the dykes and interposed beds of Plutonic rock: to some part of the internal fluid water finds access, and the steam which is generated and contained supports local columns of emitted rock in particular fissures of the earth's crust, till the lava finds vent and flows to the surface, or is driven up into dust and scoriæ by the violent extrication of the vapour: this is the local volcanic action.

Perhaps the greatest of all the recorded eruptions of Mount Vesuvius was that which occurred in A.D. 79, described in the letter of Pliny the Younger to Tacitus, which records the death of Pliny the naturalist. The long-dormant volcano had given symptoms of renewed agitation in an earthquake which occured A.D. 63. Pliny's account of the subsequent eruption in A.D. 79 is simple and striking. In August his uncle was with a fleet under his command at Misenum, in the Gulf of Naples, his sister and her son the younger Pliny being with him:—On the 24th of August, says the narrative, about one in the afternoon his sister desired him to observe a cloud of a very unusual size and shape. He was in his study; but immediately arose, and went out upon an eminence to view it more distinctly. It was not at that distance discernible from what mountain this cloud issued, but it was found afterwards to ascend from Mount Vesuvius. Its figure resembled that of a pine-tree, for it shot up to a great height in the form of a trunk, which extended itself at top into a sort of branches; and it appeared sometimes bright, and sometimes dark and spotted, as it was either more or less impregnated with earth and cinders. This was a noble phenomenon for the philosophic Pliny, who immediately ordered a light vessel to be got ready; but as he was coming out of the house with his tablets for his observations, the mariners belonging to the galleys stationed at Retina earnestly intreated him to come to their assistance, since that port being situated at the foot of Mount Vesuvius, there was no way for them to escape but by sea. He therefore ordered the galleys to be put to sea, and went himself on board, with the intention of assisting not only Retina, but several other towns situated upon that beautiful coast. He steered directly to the point of danger, from which others were flying with the utmost terror, and with so much calmness and presence of mind, as to be able to make and dictate his observations upon the motion and figure of that dreadful scene. He went so near to the mountain, that the cinders, which grew thicker and hotter the nearer he approached, fell into the ships, together with pumice-stones and black pieces of burning rock; they were likewise in danger not only of being aground by the sudden retreat of the sea, but also from the vast fragments which rolled down from the mountain, and obstructed all the shore. Here he stopped to consider whether he should return, to which the pilot advising him, 'Fortune,' says he, 'befriends the brave; carry me to Pomponianus.' Pomponianus was then at Stabiæ, a town separated by a gulf which the sea, after several windings, forms upon that shore. He found him in the greatest consternation; but exhorted him to keep up his spirits; and the more to dissipate his fears, he ordered, with an air of unconcern, the baths to be got ready. After having bathed, he sat down to supper with apparent cheerfulness. In the meanwhile the eruption from Vesuvius flamed out in several places with much violence, which the darkness of the night contributed to render still more visible and dreadful. Pliny, to soothe the apprehensions of his friend, assured him it was only the burning of the villages which the country-people had abandoned to the flames: after this he retired and had some sleep. The court which led to his apartment being in the meantime almost filled with stones and ashes, if he had continued there any longer it would have been impossible for him to have made his way out; it was therefore thought proper to awaken him. He got up, and went to Pomponianus and the rest of the company, who were not sufficiently unconcerned to think of going to bed. They consulted together whether it would be most prudent to trust to the houses, which now shook from side to side with frequent and violent rockings, or to fly to the open fields, where the calcined stones and cinders, though light indeed, yet fell in large showers and threatened destruction. In this distress they resolved for the fields, as the less dangerous situation of the two; and went out, having pillows tied upon their heads with napkins, which was all their defence against the storms of stones that fell around them. It was now day everywhere else, but there a deeper darkness prevailed than in the most obscure night, which however was in some degree dissipated by torches and other lights of various kinds. They thought proper to go down farther upon the shore to observe if they might safely put out to sea, but they found the waves still running extremely high and boisterous. There Pliny, taking a draught or two of water, threw himself down upon a cloth that was spread for him; when immediately the flames, and a strong smell of sulphur which was the forerunner of them, dispersed the rest of the company, and obliged him to arise. He raised himself, with the assistance of two of his servants (for he was corpulent), and instantly fell down dead, suffocated, as his nephew conjectures, by some gross and noxious vapour; for he had always weak lungs, and was frequently subject to

a difficulty of breathing. As soon as it was light again, which was not till the third day after, his body was found entire, and without any marks of violence upon it, exactly in the same posture that he fell, and looking more like a man asleep than dead.

It was during this eruption that the cities of Stabiæ, Pompeii, and Herculaneum were overwhelmed. An account of Pompeii is given in No. 2 of the 'Penny Magazine.' The view in the cut at the head of the present notice was taken during the last eruption of Vesuvius. During the last two centuries the intervals of repose have seldom exceeded ten years; and sometimes the mountain has flamed twice within a few months.

TAPESTRY.

In the 423rd No. of the 'Penny Magazine' a brief description was given of the origin and nature of tapestry or tapestried hangings, and of the general process whereby the celebrated *Gobelin* tapestry was produced. Since that paper was written, one or two interesting matters have come before the public notice in reference to tapestry, which may fittingly be mentioned here.

The first of these relates to the effect produced by light and air on the faded colours of tapestry. Most readers at the present day have some knowledge of the far-famed Cartoons at Hampton Court, so far at least as concerns the general subjects, and the fact that they were drawn as patterns for the tapestry-weavers to work from. The character of these celebrated productions, in connection with the sacred events which they portray, has been pretty fully entered upon in two supplements in the tenth volume, while their history was briefly sketched in the first volume. It was in this last-named article explained, that the seven cartoons at Hampton Court are only part of a larger set, of which two others are in the possession of the King of Sardinia, and one in that of P. Hoare, Esq.; while all the remainder are lost. How these were painted for pope Leo X. by Raffaelle - how they were sent from Rome to Brussels, to serve as copies for the weavers of a suite of tapestries for the Vatican at Rome—and how the cartoons, when no longer wanted by the weaver, were strangely neglected, and transferred from one possessor to another—are matters of detail belonging to the Hampton Court cartoons. But the point to which our present object requires us to direct attention is this: that Leo X. ordered *two* sets of tapestried hangings to be worked from the cartoons—one for his own palace, and the other as a present to Henry VIII. It is to the second of these two sets that we have here to confine ourselves; and for the convenience of those readers who may not have the first volume of the Magazine at hand, we transcribe from it the following short paragraph:—"The second set of tapestries, intended by Leo X. as a present to Henry VIII. of England, were accordingly transmitted to that monarch, although it is affirmed by some authorities that he obtained them by purchase from the state of Venice. On their arrival in England, they were hung up in Whitehall, and descended as a royal appanage through the reigns of Edward VI., Mary, Elizabeth, James I., and Charles I. After the death of that unfortunate monarch, they were purchased by the Spanish ambassador in London (Don Alonzo de Cardanas), who carried them to Spain, and from him they devolved to the house of Alva. From a palace belonging to the dukes of that name, they were purchased, a few years since, by Mr. Tupper, our consul in Spain, and restored to this country. They were afterwards exhibited for some time at the Egyptian Hall, in Piccadilly; finally repurchased by a foreigner, and by him taken back to the Continent."

Now it appears to be the set of tapestries here alluded to which were exhibited again in London in 1838, six years after the above paragraph was written. Six tapestries constituted the exhibition, being a part of ten forming the set alleged to have been presented by Leo X. to Henry VIII. Of these six tapestries it was said at the time by a writer in the 'Athenæum'—"They have not the broad allegorical foot and side borders (except a single one in the Elymas), several of which remain to the Vatican set, but otherwise seem better preserved than the latter—as well as we recollect them. Both have now lost the freshness and beautiful *shimmer* which so ecstatified Vasari, the gold and silver thread that produced it having become quite dull; also the delicate blush-colours which gave the flesh-tints are nearly flown, rendering the whole effect feeble and somewhat vapid. From their peculiar texture these tapestries are apt to shrivel up or *cockle*, which has disfigured the outline and expression in many places, though re-stretched by their proprietor with much skill. Some are better than others: the heads in Christ's Charge to Peter may be pronounced fine. Still visitors must not expect to meet with the profound merits of Raffaelle, untransferable to any rug-work, however exquisite; but be satisfied with a rich general effect, and the curious dexterity by which it is obtained in such a material."

The dullness and faded tints here alluded to seem to have been removed in the course of a few months by the exposure of the tapestries to light and air. Mr. Faraday addressed a letter to the editors of the 'Philosophical Magazine' in 1839, inclosing others which he had received from Mr. Trull, the then proprietor of the tapestries. These letters were published in that magazine in June, 1839. The tapestries had been removed from the exhibition-room in London to Coventry, whence Mr. Trull writing to Mr. Faraday, says: —"The interest you took in observing the changes of colour in the Raphael * tapestries, after being exposed to light in London last July, made me anxious to communicate to you the extraordinary effects since produced, by the simple means suggested by yourself and other scientific gentlemen, of a more perfect exposure to light and air, which have for the last seven months been obtained in a finely situated factory here.' The tapestries appear to have been for years packed up in boxes, whereby the colours had become obscure and imperfect, and the restoration from these defects was the effect to which Mr. Trull alluded. The greens had become blue, and the full colours generally had become dull and heavy; but exposure to light and air recovered the greens, and restored the brilliancy of the other colours. The flesh-tints, which had become pallid almost to whiteness, regained their wonted appearance. In some of the tapestries, viz., Christ's Charge to Peter, St. Paul at Athens, and the Death of Ananias, extensive landscapes, ranges of buildings, and foliage, to use Mr. Trull's words, "have sprung up like magic on parts quite obscured when up in London eight months back, much of which is either worn or torn out of Raphael's patterns at Hampton, or painted over, and known only through the means of these Leo tapestries." In a subsequent letter to Mr. Faraday, Mr. Trull says:—"I think, Sir, you will recollect the subject of the Stoning of St Stephen—the large masses of blue cloud-like appearance hanging about and over Jerusalem: these have nearly disappeared, and mountain-scenery taken the place. The olive-grove, which only showed a few trees in front all blue, and a heavy blue-like curtain over all of the grove—the curtain has disappeared, and a fine deep grove is now seen;

* It may not be superfluous to remark that *Raphael* and *Raffaelle*, which have led some persons to doubt whether the same person be meant, are respectively the English and the Italian forms of spelling the same name.

the natural green and mossy hues have nearly taken their original state fresh lights keep breaking out, and showing even deeper in the grove and through out the works the [illegible] nal lights are working their way from the [illegible] [illegible] [illegible]urs'

This re tor[illegible] [illegible] colour by the effect of light and air is a point worthy of further attention It was brought to notice about the time when the photographic phenomena assumed importance in connexion with the fine arts and it is not improbable that future observations will lead to valuable results in both these respects

The other matter which we wished to notice is a very remarkable method recently promulgated of producing tapestry whereby many copies of one piece of tapestry may be produced with nearly as little trouble as one piece or copy The tapestries hitherto executed have been produced in one of two ways known respectively as the *Gobelin* and the *Arras* the first named after two brothers who established the tapestry manufacture in Paris and the second named after the Belgian town in which it was first worked In the Gobelin tapestry the *warp* or long threads are stretched vertically in a frame and the *weft* or cross threads which form the chief constituent of the pattern, are worked in by means of a kind of shuttle very much in the same way as frame-weaving, the weft-threads being of different colours or of gold or silver, according to the different parts of the device In Arras tapestry the device is not woven at once in this manner, but is wrought piecemeal the larger and smaller objects of the tapestry forming so many distinct patterns [illegible] to [illegible] analogous to the ancient manner of welding the fragments of stained glass into a window only that the juncture is almost invisible

The new kind of tapestry is altogether different from either of these It is a singular application of mosaic work and in order to understand it it would be well to notice previously some specimens of mosaic wrought in glass Winckelmann describes a small mosaic, brought to Rome in the year 1765 in which the device was wholly produced by laying little rods or pins of glass of different colours side by side the intermixture and disposition of colours being such as to give the device One small piece of this mosaic represented a duck and Winckelmann describes it thus —'The outlines are well decided and sharp the colours beautiful and pure and have a very striking and beautiful effect because the artist according to the nature of the parts has in some employed an opaque, and in others a transparent glass The most delicate pencil of the miniature painter could not have traced more accurately and distinctly either the circle of the pupil of the eye or the apparently scaly feathers on the breast and wings But the admiration of the beholder is at the highest pitch when, by turning the glass he sees the same bird in the reverse without perceiving any difference in the smallest point, whence we could not but conclude that this picture is continued through the whole thickness of the specimen, and that if the glass were cut transversely the same picture of the duck would be found repeated in the several slabs, a conclusion which was still further confirmed by the transparent places of some beautiful colours upon the eye and breast that were observed The painting has on both sides a granular appearance and seems to have been formed in the manner of mosaic-work, of single pieces but so accurately united, that a powerful magnifying-glass was unable to discover any junctures Further details given by Winckelmann and Keyster seem to show that specimens such as these were formed of slender glass rods or pins, laid side by side in the manner of types and then gently fused at the surface to amalgamate them together

Now if we substitute for glass rods *yarns of coloured wool* we shall have some idea of the new kind of tapestry At the Manchester meeting of the British Association in June, 1842, Professor Vignolles brought before the notice of the mechanical section the new method in question He did not state who was the inventor nor we believe was any account given of the circumstance under which the new method was introduced but confined himself to a general exposition of the principle involved The picture or tapestry carpet call it which we may is composed of innumerable threads or [illegible] of variously coloured woollen threads about one eighth of an inch long each and standing vertically one end being seen and the other cemented by India rubber to a piece of cloth

The working machinery was described as consisting of two frames of fine wire or perforated zinc with as many as four thousand perforations in a square inch placed over each other at a distance of five or more feet according to the height of the room the two wire frames are horizontal with the meshes of the one exactly over those of the other The picture to be copied being then traced on the top side of the upper frame a workman passes the end of dyed wool through the corresponding holes in the top and bottom frame varying his colours [illegible] to [illegible] ance those of the picture [illegible] [illegible] [illegible] [illegible] down on the upper ends of the threads [illegible] [illegible] occupies a certain definite position [illegible] [illegible] When all the threads are thus [illegible] [illegible] form a compact [illegible] mass [illegible] [illegible] semblance of a picture when viewed [illegible] horizontally When the threads have been [illegible] introduced in their proper order the upper end [illegible] covered with India rubber cement and a cloth [illegible] upon them also covered with cement by which the ends of the threads are made to adhere firmly to the cloth By means of a sharp cutting instrument the entire mass of threads is now cut through [illegible] [illegible] sely at about one eighth of an inch from the cloth This process being repeated a fresh copy is obtained from every eighth of an inch In a frame of which the upper and lower surfaces are five feet apart four hundred and eighty copies can thus be cut from one mass of threads and this number could be increased by an increased height of the frame The multiplication of copies here alluded to seem to be [illegible] of the features for which the method is noticeable since the expense of a single copy if only one could be produced by one threading of the wires would be too great to answer as a commercial speculation As the use of tapestried hangings for the walls of rooms is nearly obsolete, the method is proposed to be applied to the formation of carpets rugs curtains chair covers, table covers &c for some of which purposes the nap or pile might be left longer than one eighth of an inch, thus producing a thicker and softer substance

There is one point which may occur to the mind of a reader as rendering the above account somewhat incomplete If there be only *two* perforated plates, one at the top and the other at the bottom and if the threads be cut just *below* the upper plate all the remaining threads would fall down in disorder, and the artist would have his work to do over again to procure a second copy If they be cut *above* the upper plate then there must be some contrivance for shifting that plate lower and lower in proportion as more and more copies are cut off These, however, are matters of detail, which probably could not at present be properly made public The principle involved is clear distinct, and very elegant, and we should be glad to hear of it being practically applied to manufacturing purposes

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. IX.

THE GATES OF SAN GIOVANNI.

[Concluded from p. 18[illegible].]

The citizens of Florence were probably not less desirous than we should be in our day to behold the completion of a work begun with so much solemnity. But the great artist who had undertaken it was not hurried into carelessness by their impatience or his own; nor did he contract to finish it like a blacksmith's job in a given time. He set about it with all due gravity and consideration; yet, as he describes his own feelings in his own words, *con grandissima diligenza e grandissimo amore*, with infinite diligence and infinite love. He began his designs and models in 1402, and in twenty-two years from that time, that is, in 1424, the gate was finished and erected in its place. As in the first gate Andrea Pisano had chosen for his theme the life of John the Baptist, the precursor of the Saviour, and the patron saint of the Baptistery, Lorenzo continued the history of the Redemption in a series of subjects from the Annunciation* to the Descent of the Holy Ghost; these he represented in twenty panels or compartments, ten on each of the folding doors; and below these eight others, containing the full-length figures of the four evangelists and the four doctors of the Latin church, grand and majestic figures;—and the whole is bordered with rich ornaments, heads of the prophets and the sibyls, remarkable for the beauty of the design and the delicacy of the workmanship; the whole was cast in bronze and weighed 34,000 pounds of metal.

The success which attended this great work conferred not only on Lorenzo himself, but the whole city of Florence, that he was regarded as a public benefactor, and shortly after the same company confided to him the execution of the third gate of the same edifice. The gate of Andrea Pisano formed the principal entrance; it was removed to the side, and Lorenzo was desired to construct a central gate which was to surpass the two lateral ones in beauty and richness. He chose this time the history of the Old Testament, the subjects being selected by Leonardo Bruni d'Arezzo, chancellor of the republic, and represented by Ghiberti in ten compartments, each two and a half feet square, beginning with the Creation and ending with the Meeting of Solomon and the Queen of Sheba; and he enclosed the whole in an elaborate border or frame composed of intermingled fruits and foliage, and full-length figures of the heroes and prophets of the Old Testament, standing in niches, to the number of twenty-four, each about fourteen inches high, wonderful for their various and appropriate character, for correct, animated design, and delicacy of workmanship. This gate, of the same material and weight as the former, was commenced in 1428 and finished about 1444.†

It is especially worthy of remark that the only fault of these otherwise *faultless* works was precisely that character of style which rendered them so influential as a school of imitation and emulation for painters. The subjects are in sculpture, in relief, and cast in the hardest, severest, darkest, and most inflexible of all manageable materials—in bronze. Yet they are treated throughout much more in accordance with the principles of painting than with those of sculpture. We have here groups of numerous figures, near or receding from the eye in just gradations of size and relief according to the rules of perspective; different actions of the same story represented on different planes; buildings of elaborate architecture, landscape, trees, and animals,—in short, a dramatic and scenic style of conception and effect wholly opposed to the severe simplicity of classical sculpture. Ghiberti's genius, notwithstanding the inflexible material in which he embodied his conceptions, was in its nature bent pictorial rather than sculptural, and each panel of his beautiful gates is, in fact, a picture in relief, and must be considered and judged as such. Regarding them in this point of view, and not subjecting them to those rules of criticism which apply to sculpture, we shall be able to appreciate the astonishing fertility of invention exhibited in the various designs, the felicity and clearness with which every story is told, the grace and naïveté of some of the figures,* the simple grandeur of others, the luxuriant fancy displayed in the ornaments, and the perfection with which the whole is executed;—and to echo the praise of Michael Angelo, who pronounced these gates "*worthy to be the Gates of Paradise!*"



Complete sets of casts from these celebrated compositions are not commonly met with, but they are to be found in most of the collections and academies on the Continent. King Louis Philippe lately presented a set to the museum at Frankfort. That man, whether prince or peer, would deserve well of his country who should present such a gift to our National Museum or to the Government School of Design. Very fine casts of two of the compartments of the principal gate—the Death of Goliath and the Visit of the Queen of Sheba—are in the possession of Mr. Henry Harrison, an eminent archi-

* Represented in the wood cut at the head of this essay (p. 185).

† Authorities differ as to dates: those cited above are from the notes to the last Florence edit. of Vasari (1838). See also Rumohr, Italienische Forschungen, vol. ii. and Cicognara, 'Storia della Scultura Moderna.'

* The angels in the wood cut above are a perfect example of this grace and simplicity.

tect, residing in Hill Street, Berkeley Square. Among the casts and models in the School of Design at Somerset House is an exquisite little basso-rilievo, representing the Triumph of Ariadne, so perfect, so pure, so classical in taste that it might easily be mistaken for a fragment of the finest Greek sculpture. These are the only specimens of Gherardi's skill to which the writer can refer as accessible in this country.

Engraved outlines of the subjects on the three gates were published at Florence in 1821, by G. P. Lasinio.* There is also a large set of engravings from the ten subjects on the principal gate, executed in a good bold style by Thomas Patch, and published by him at Florence in 1771.†

Lorenzo Ghiberti died about the year 1455, at the age of 77. His former competitors, Brunelleschi and Donatello, remained his friends through life, and have left behind them names not less celebrated, the one as an architect, the other as a sculptor.

This is the history of those famous gates

"So marvellously wrought,
That they might serve to be the gates of Heaven!"

PROGRESSES OF QUEEN ELIZABETH.
No. VI.

SURREY—SUSSEX—KENT.

THE Queen having kept her Christmas at Hampton Court, her first progress in 1573 was to visit the archbishop of Canterbury at Lambeth. Thence she went to Greenwich, where she kept her Maundy with much pomp; the poor people attending in the hall, where their feet were washed, first by the yeoman of the laundry, with warm water and sweet herbs, afterwards by the sub-almoner, then by the almoner, and lastly by the Queen herself, who came into the hall; "and after some singing and prayers made, and the gospel of Christ's washing his disciples' feet read, thirty-nine ladies and gentlewomen (for so many were the poor folk, according to the number of the years complete of her Majesty's age) addressed themselves with aprons and towels to wait upon her Majesty; and she, kneeling down upon the cushions and carpets under the feet of the poor women, first washed one foot of every of them in so many several basons of warm water and sweet flowers brought to her severally by the said ladies and gentlewomen, then wiped, crossed, and kissed them, as the almoner and others had done before. When her Majesty had thus gone through the whole number of thirty-nine (of which twenty sat on the one side of the hall and nineteen on the other), she resorted to the first again, and gave to each one certain yards of broad cloth to make a gown. Thirdly, she began at the first and gave to each of them a pair of shoes. Fourthly, to each of them a wooden platter, wherein was half a side of salmon, as much ling, six red herrings, and two cheat‡ loaves of bread. Fifthly, she began with the first again, and gave to each of them a white wooden dish with claret wine. Sixthly, she received of each waiting lady and gentlewoman their towel and apron, and gave to each poor woman one of the same. And after this the ladies and gentlewomen waited no longer, nor served as they had done throughout the courses before, but then the Treasurer of the Chamber (Mr. Heneage) came to her Majesty with thirty-nine small white purses, wherein were also thirty-nine pence (as they say) after the number of the years of her Majesty's age; and of him she received and distributed them severally; which done, she received of him several red leather-purses, each containing twenty shillings, for the redemption of her Majesty's gown, which (as men say) by ancient order she ought to give to some one of them at her pleasure; but she, to avoid the trouble of suit, which accustomably was made for that preferment, had changed that reward into money, to be equally divided amongst them all, namely, twenty shillings a piece; and those she also delivered particularly to each one of the whole company; and so taking her ease upon the cushion of state, and hearing the choir a little while, her Majesty withdrew herself and the company departed; for it was by that time the sun-setting."* The dole still continues to be distributed by the almoner at Whitehall, but the ceremony of the washing has not been practised since the time of James II.

The progresses of the Queen during the year were confined to the counties of Surrey, Kent, and Sussex. On the 14th of June she visited Parker, the archbishop of Canterbury, at Croydon. She was splendidly received, but on leaving, continued to express her dislike of the marriage of the clergy, by addressing his wife as follows:—"Madam I may not call you, Mistress I am afraid to call you; yet, as I know not what to call you, I thank you." Elizabeth knew well how to be complimentary, and her general affability was made to conduce to her extreme popularity; but on occasions when her feelings gained the ascendency over her prudence, there is a concentrated bitterness in her sarcasms that seems far more in unison with the stern character of her actions than her customary kindly demeanour, and proves that she exercised a most remarkable power of self-command in general, adapting herself to the circumstances in which she was placed.

From Croydon her Majesty proceeded to the seat of Sir Percival Hart, at Orpington, Kent, where she "received the first caresses by a nymph which personated the genius of the house; then the scene was shifted, and from several chambers which, as they were contrived, represented a ship, a sea-conflict was offered up to the spectators' view, which so much obliged the eyes of this princess with the charms of delight, that, upon her departure, she left upon this house (to perpetuate the memory both of the author and artifice) the name and appellation of Bark Hart." She thence, after a stay of three days, proceeded to her own house at Knowle, remaining there five days; thence to Birlingham, or Birling, the residence at that time of the Nevilles, earls of Abergavenny, though subsequently abandoned by them, first for Kidbrook, and more recently for Bridge Castle; what is yet left of Birling is now used as a farm-house. Here she remained for three days, removing thence to Sir Thomas Gresham's at Mayfield. This seat had been a palace belonging to the archbishops of Canterbury, but alienated by Cranmer in 1525 to Henry VIII., who gave it to Sir Edmund North, and he had sold it to the princely merchant. This and Osterley seem to have been his chief seats, and both were richly furnished. Mayfield is now a ruin, but an interesting one. Placed on the summit of one of the highest hillocks of a hillocky district (though tolerably steep, these eminences can scarcely be called hills), and the front facing the south, the view is extensive and picturesque; and the grounds, which do not appear to have been large, are bounded on one side by the churchyard, with its venerable tombs, and its handsome old church, which has been preserved with a care that contrasts powerfully with the neglect displayed in the adjacent palace. A

* 'Le tre Porte del Battistero di San Giovanni di Firenze, incise ed illustrate.'

† The bronze doors of the church De la Madeleine at Paris were executed a few years ago, in imitation of the Gates of Ghiberti, by M. Henri de Triqueti, a young sculptor of singular merit and genius. The subjects are the Ten Commandments.

‡ Manchet—small loaves of fine white bread.

* From Wm. Lambarde, the antiquary, in Nichols's 'Progresses.'

part of the old palace has been fitted up as a dwelling-house, and in this is a room still shown as Queen Elizabeth's room. The great hall, though without a roof, is still magnificent; it is 68 feet long by 38 broad, with a proportionate height, as shown by the cross arches which yet exist. At the upper end of the hall, against the wall, is the back of the archiepiscopal chair, appearing somewhat like a Gothic arch, and over it are the remains of what appears to have been a canopy, the whole adorned with elegant carving, consisting of roses within small squares. Above the whole is a niche which may have contained a statue. At the lower end of the hall is a small apartment said to have been the chapel, but from its construction that seems doubtful. The window near the niche at the upper end belonged to the archbishop's chamber, and gave him an opportunity of overseeing the hall without being himself visible, a not uncommon construction in ancient mansions. The gate-house still remains entire, and is used as a dwelling, but is of much later construction than the palace—indeed, appears to have been formed out of its old materials.

The Queen then visited in succession, remaining two or three days at each, Eridge, another seat of Lord Abergavenny's; Mr. Culpeper's at Bedgebury; Mr. Guilford's, at Hempstead; and thence to Rye. Of these movements Lord Burghley writes to the Earl of Shrewsbury:—"The Queen had a hard beginning of her progress in the Wild [Weald] of Kent; and namely, in some parts of Sussex, where surely were more dangerous rocks and valleys, and much worse ground, than was in the Peak." At Rye she knighted her two hosts, Thomas Culpeper and Alexander Guilford. From Rye she went to Mr. Baker's, at Sissinghurst, and thence to Mr. Wotton's, at Boughton Malherb, who, "by his labour and suit, was not then made a knight;" he had no taste for Elizabeth's cheap rewards, though described by Hasted as "remarkable for his hospitality, a great lover and much beloved of his country, a cherisher of learning, and, besides his own abilities, possessed of a plentiful estate, and the ancient interest of this family." Thence to Mr. Tufton's, at Hothfield; to her own house at Westerhanger; to Sandown Castle, where she dined; and so to Dover, being met on Folkstone Down by the Archbishop of Canterbury and many knights and gentlemen of the county, and conducted into Dover Castle amid the ringing of bells and the "roaring of heavy ordnance."

Of her reception at Dover we have no further account; but her entertainment at Sandwich, whither she next proceeded, was of a most sumptuous character, and proves that the town at that time must have been in a state of prosperity affording a melancholy contrast to its present depressed condition. Before her arrival the following orders were issued by the corporation preparatory to her reception:—"Two jurats to go to London to purchase a gold cup of the value of 100*l.*, to be presented to the queen. Buildings to be repaired, and the houses in Strand Street and elsewhere to be beautified and adorned with black and white; the streets to be paved; and all dung and filth to be removed or covered with earth. No persons to keep hogs but in certain appointed places. Two hundred persons to be apparelled in white doublets, black gally gascoignes and white garters, to be furnished with calivers. Scaffolds to be erected in Strand Street, and to be hung with black and white baize; children to be placed thereon, spinning yarn. Butchers to carry their offal to the furthest groyne-head till after her highness's departure. The brewers enjoined to brew good beer against her coming. The Lord Warden desires one hundred men may be sent from Sandwich, properly armed and accoutred, to attend at Dover Castle while the queen shall stay there."

The dung and filth being carefully "covered with earth," the butchers having removed their offal to the "furthest groyne-head" (or wharf), the guards having donned their "black gally gascoignes and white garters," and the fair dames of Sandwich no doubt adorned with equal elegance, it is stated:—"That the last day of August, being Monday, her Majesty came to this said town about seven of the clock in the evening, at which time John Gylbart, mayor, accompanied with nine jurats, the town-clerk, and some of the common council, received her Highness at Sandown, at the uttermost end thereof, the said mayor apparelled in a scarlet gown, at which place her Majesty stayed. And there the said mayor yielded up to her Majesty his mace. And not far from thence stood three hundred persons, or thereabouts, apparelled in white doublets, with black and white ribbons in the sleeves, black gascony hose, and white garters, every of them having a morion (casque) and a calyver, or demi-musket; having three drums and three ensigns, and three captains, viz., Mr. Alexander Cobbe, Mr. Edward Peake, and Mr. Edward Wood, jurats: every of these discharged their shot, her Majesty being at Downs Gate. And during her Majesty's standing and receiving of the mace, the great ordnance was discharged, which was to the number of a hundred or a hundred and twenty; and that in such good order, as the queen and noblemen gave great commendation thereof, and said that Sandwich should have the honour, as well as for the good order thereof, as also of their small shot. Then her Majesty went towards the town; and at Sandown arms were hanged up upon the gates. All the town was gravelled, and strewed with rushe herbs, flags, and such like: every house having a number of green boughs standing against the door and walls; every house painted white and black. Her Majesty rode into the town; and in divers places, as far as her lodgings, were divers cords, made of vine-branches, with their leaves hanging cross the streets, and upon them divers garlands of fine flowers. And so she rode forth till she came directly over against Mr. Cripps's house, almost as far as the Pelican, where stood a fine house, newly built and vaulted, over whereon her arms was set and hanged with tapestry. In the same sate Richard Spycer, minister of St. Clement's parish, a Master of Art, the town's orator, apparelled in a black gown and a hood, both lined and faced with black taffeta, being the gift of the town, accompanied with the other two ministers and the schoolmaster. He made unto her Majesty an oration, which she so well liked as she gave thereof a singular commendation, saying it was both very well handled and very eloquent. Then he presented her with a cup of gold, which Thomas Gylbart, son to the mayor aforesaid, received from Mr. Spycer, and he gave it to the footman, of whom her Majesty received it, and so delivered it to Mr. Ralph Lane, one of the gentlemen equerries, who carried it. And the said Mr. Spycer presented her with a New Testament in Greek, which she thankfully accepted; and so rode until she came unto Mr. Manwood's house, wherein she lodged, a house wherein King Henry VIII. had been lodged twice before. And here it is to be noted, that upon every post and corner, from her first entry to her lodgings, were fixed certain verses, and against the court-gate all these verses put into a table, and there hanged up.

"The next day being Tuesday, and the 1st of September, the town having builded a fort at Stoner, the other side of the haven, the captains aforesaid led over their men to assault the said fort, during which time certain Walloons that could well swim had prepared two boats, and in the end of the boat a board, upon which board stood a man, and so met together with either of them a staff and a shield of wood; and one

of them did overthrow another, at which the queen had good sport. And that done, the captains put their men into a battle, and, taking with them some loose shot, gave the scarmirche (skirmish, or attack) to the fort; and in the end, after a discharge of two falconets and certain chambers (species of cannon), after divers assaults, the fort was won.

"The next day, viz. Wednesday, the 2nd of September, Mrs. Mayoress and her sisters the jurat's wives, made the Queen's Majesty a banquet of 160 dishes on a table of 28 feet long in the school-house, and so her Majesty came thither through Mrs. Manwood's garden and through Mr. Wood's also, the way hanged with black and white baize; and in the school-house garden Mr. Isebrand made unto her an oration, and presented to her highness a cup of silver and gilt, with a cover to the same, well near a cubit high, to whom her Majesty answered this—'Gaudeo me in hoc natum esse, ut vobis et Ecclesie Dei prosim;' and so entered into the school-house, where she was merry, and did eat of divers dishes without any assay, and caused certain to be reserved for her, and carried to her lodging.

"The next day, being Thursday, and the day of her departing, against the school-house upon the new turfed yard were divers children; English and Dutch, to the number of one hundred or six score, all spinning of fine lay yarn, a thing well liked both of her Majesty and of the nobility and ladies. And without the gate stood all the soldiers with their small shot, and upon the wall, at the buts, stood certain great pieces; but the chambers, by means of the wetness of the morning, could not be discharged. The great pieces were shot off, and the small shot discharged thrice. And at her departing Mr. Mayor exhibited unto her a supplication for the haven; which she took and promised herself to read. My Lord Treasurer, my Lord Admiral, my Lord Chamberlain, and my Lord of Leicester, were made privy to the suit for the haven; they liked well thereof, and promised their furtherance."

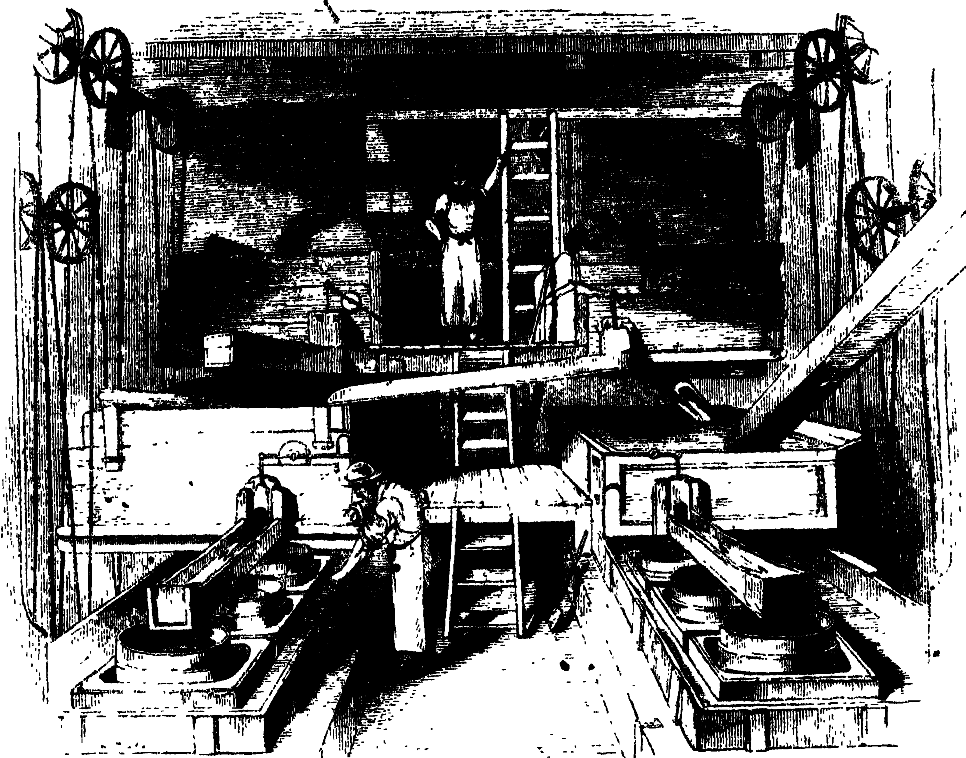
But the haven unfortunately was beyond their help, and the prosperity which it had hitherto fostered, assisted as it had been by the protection given by Elizabeth to the Netherlanders driven from their own country by the measures of Philip of Spain and his too celebrated governor the Duke of Alva, departed by rapid degrees. These emigrants had brought over the knowledge and practice of the woollen manufacture, which, though the haven of Sandwich lost its importance, and the settlers have left but small traces among the inhabitants, has extended itself into other districts, and is now one of the staple manufactures of England.

From Sandwich the Queen proceeded to Wingham, and thence to Canterbury, where she was entertained by the Archbishop in the old palace of St. Augustine. Here she continued for fourteen days, removing thence to Sittingbourne, and so to Rochester, where she arrived on Saturday, September 18. She attended divine service in the Cathedral on the Sunday, and remained there three other days, during which she visited Chatham Dock-yard, and Richard Watts, the member for the city, whose hospital, which he endowed for the relief of six poor travellers (who, "not being rogues or proctors," may receive a night's lodging, refreshment, and fourpence), yet exists. She was next splendidly entertained at Cobham Hall for two days, and thence returned to her palace at Greenwich.

Husbandry Affairs in 1469.—The following is a letter from a farm-steward to his master, dated Kinalton, Notts, 21st of August, 1469, taken from 'The Plumpton Correspondence,' published by the Camden Society.—"Right Worshipful Master, —I recommend me unto you, praying that you will cause the cloth that the wool was packed in for to come again with the ship, for I borrow it where that ye saw that I borrow it; of that of your servants aforetime have borrowed two pack-cloths and other geer, which they had never again: letting you understand that I have given the shipman of his hire 10s., and he for to have his whole payment when he deliver the goods which he received, which is 31s. 4d. Wherefore I pray you that ye see that he be content of the said sum, for I am not in store at this time of money for to get your harvest with, withouten I might get it of your tenants, or else for to take of your sheep silver, and that I were right loath for to do—letting you wit also that I have been in the Peak (of Derbyshire), and there I cannot get no money of Harry Fulgiam (Foljambe), nor of Jno of Tor, nor no other that owes you, but if I should take of your cattle, and so I think for to do; for I have no oxen to get your corn with, nor none I cannot get carried, for every man is so busy with their own (21st August); for weather is so latesome in this country (Kinalton, Notts) that men can neither well get corn nor hay—letting you wit that our tenant Nichol Bristow hath not gotten but twelve fodder of hay, and it is nought good, and the corn land is overfloating with water—letting you wit that I have gotten the hay in Heslthorne meen that was left after Lammas day, as ye commanded me for to do—letting you wit that I have a counterpoise weight of the weight-stone that the wool was weighed with, and that ye see that the stone be kept that the shipman brings. Also letting you wit that I delivered the shipman eight pair of blankets that is not in the bill indented, and a hanging of old linen cloth that the coverlets are trussed in—letting you wit that I was on St. Lawrence Day at Melton, with forty of your sheep to sell, and could sell none of them, but if I would have selled twenty of the best of them for 13*d.* a piece: and therefore I selled none. . . . Also that you can [cause] the malt to be windowed, or [ere] it be laid in my garners, for else there will breed wyvolls [weevils] in it; for I could not get it winnowed before it went to the ship, because that I could get no help; and therefore I upheaped with a quarter twenty-one quarters for twenty quarters; and also six of your cheeses has two marks, that I know to be the best of them. No more I write to you at this time, but that the Holy Trinity have you ever in his keeping.—Written in haste by your servant, Thos. Billop, at Kinalton, the Monday afore St. Bartholomew Day, 9th Edw. IV."

Fountain of Elisha.—Our ride of the morning, though trifling in respect of time or distance, had left some of our party and myself but little disposed for further exertion. Lady F., however, was unexhausted: and the beauty of the evening and its comparative coolness induced her and myself to undertake a visit to the neighbouring spring, which bears the name of the Prophet Elisha, and is the source of the waters which he sweetened. Never was a trifling exertion better rewarded. Our indefatigable janissary and escort mounted with the utmost alacrity; and the latter skirmished again incessantly during our ride of some twenty minutes through the jungle. The fountain is situated at the base of the hill chain, a neighbouring summit of which is pointed out as the scene of our Lord's fasting and temptation. I have scarcely seen a nobler source. It might vie in volume with Holywell, or with another spring dear to my recollections, that of Woolmers, in Hertfordshire, whose waters the Duke of Bridgwater projected to conduct to London in rivalry with the New River. Some ancient masonry fences in the water on the one side; a gigantic fig-tree, its white stem gleaming through its leaves, overshadows the source; and the stream rushes on through high reeds and dense jungle, over which the distant hills of Moab were seen, crimson with the last glow of parting day. The red aspect of these bare mountains is very striking, even when not thus illuminated. The bare and bald effect of this species of Syrian scenery has been very happily rendered in a panorama lately exhibited of Damascus. It suggested here to the recollection the passage of 2 Kings iii. 22, which commemorates the dispersion of the hosts of Moab, when the flood came down in the night from a mountain rain which refreshed the exhausted hosts of Judah, Israel, and Edom, and which, by the redness of its current, made the Moabite believe that the allied powers had fought amongst themselves, and that the trenches were reddened with the bloodshed: 'And they said, this is blood. Now, therefore, Moab to the spoil. The kings are surely slain, and they have smitten one another.' The recking horses of our escort needed no invitation to the stream; and, while they refreshed themselves in its pellucid waters, the scene formed as compact, manageable, and complete a subject for the pencil as ever made me sigh over my inability to do it justice.—*Lord Francis Egerton's Mediterranean Sketches.*

A DAY AT THE STAFFORDSHIRE POTTERIES.



[Mill-Room, where the Ingredients for Pottery are mixed.]

THERE are doubtless many readers who, when they see mention made of the "Staffordshire Potteries," marvel what these potteries mean: whether the phrase implies a number of pottery factories collected in one town, or a number of towns in one district distinguished for the prevalence of this branch of manufacture; and again, what are the reasons for the location of this department of industry in the county in question. Our present "Day's Visit" may perhaps enable us to answer both these questions.

The district known as the Staffordshire Potteries is a portion of the county about ten miles in length and two or three in breadth, lying a little eastward of the town of Newcastle-under-Lyme, and occupying an area of perhaps twenty thousand acres. It may be characterised as one long street from end to end, for the successive towns and villages are so near each other, and have gradually been so connected by rows of houses, that the eye glances from one to another with scarcely an appreciable interruption. The towns, townships, hamlets, and villages are very numerous; but the most notable are Tunstall, Burslem, Cobridge, Hanley, Shelton, Etruria, Stoke, Fenton, and Lane End; and if we pass through these towns on the high road, we shall find on either side a continued string of potteries and porcelain works, so large and so numerous that one may almost wonder where a market can be found for the immense mass of articles produced there.

This, then, is the Pottery district; and on inquiring into its history, we shall find that the busy hive of potters has been accumulated there by two circumstances—the existence in the neighbourhood of mineral products indispensable to the manufacture: and the facilities which are always afforded when many men of one trade congregate in one place. The talents and energies of a Wedgwood would have created a manufacture anywhere; but when these were brought to bear in a district already distinguished for its manufactures, the spot could not fail to become a great centre of productive industry.

There are indications that the pottery art was exercised in Staffordshire in the time of the Romans; for many specimens of earthen vessels are occasionally dug up in the district, referable to no later period of English history. Whether, or to what extent, the manufacture was there carried on in the ages subsequent to the Roman occupation, can now hardly be answered. It will suffice to say that Burslem, the "Mother of the Potteries," exhibits proof that this manufacture has been carried on there for centuries. Before the time when Dr. Plot made his survey of Staffordshire in 1686, there were here and there kilns and ovens, with rude buildings covered with thatch. The manufacture of *butter-pots* seems to have been in the seventeenth century a kind of staple product at Burslem. Plot says that "the greatest pottery they have in this county is carried on at Burslem, near Newcastle-under-Lyme, where for making their several sorts of pots they have as many different sorts of clay, which they dig round about the town, all within half a mile distance, the best being found nearest the coal, and are distinguished by their colours and uses." He also tells us that at that time (1686) "the factors

buy their butter by the pot, of a long cylindrical form, made at Burslem, of a certain size, so as not to weigh above six pounds at most, and to contain at least fourteen pounds of butter."

The wares made at that time at Burslem (then the only pottery town in the district) were of a very rough and coarse kind; but a discovery made towards the end of the seventeenth century paved the way for great improvements: this was the use of salt in glazing pottery, apparently until then unused in this country. The incident is recorded thus:—At Stanley Farm, situated not far from Burslem, the servant of Mr. Joseph Yates was boiling in an earthen vessel a strong lixivium of common salt, to be used in curing pork. During her temporary absence the liquor boiled over, and some ran down the sides of the vessel, covering the surface with a liquid which on cooling appeared as a glaze. Mr. Palmer, a potter of the neighbourhood, being made acquainted with the fact, speedily availed himself of it, and established the manufacture of the common brown glazed ware. There were salt-beds in some of the neighbouring districts, and this led to the extension of the manufacture to spots still farther from Burslem.

About the year 1690 a very remarkable instance of the extension of the potteries near Burslem occurred. At that time the East India Company were in the habit of importing from the East "unglazed red porcelain" vessels, of a beautiful red colour and form, which had never been equalled in England on account of the want of the proper clay. It was discovered, however, that at Bradwell and Brownhills, near Burslem, a fine-grained and beautifully-tinted red clay could be procured; and this, together with an abundant supply of coals for the ovens, led to the establishment of a pottery at Bradwell by the Messrs. Elers, from Nuremberg. Here they made red porcelain unglazed tea-pots, simply of the fine red clay of the district; as also black or Egyptian porcelain, by adding manganese to deepen the tint. The brothers Elers seem to have been in advance of their neighbours, and to have taken extraordinary precautions to baffle curiosity. The servants employed were ignorant and stupid; and the thrower's wheel was turned by an idiot: each person was locked in the place where he was employed; and such were the precautions to preserve the supposed secret, that previous to the work-people retiring at night, each was subjected to a rigid examination. However, all their precautions were fruitless; for two persons, named Twyford and Astbury, succeeded in worming out the secret. The former got employment at the works; and by manifesting entire carelessness and indifference to the nature of the processes, he masked his real object, which was to find out all that was new in the operations at Elers' works. Of the other man, Astbury, the account handed down is very remarkable. Having assumed the garb and appearance of an idiot, with all proper vacuity of countenance, he obtained employment at the Bradwell manufactory, and received the cuffs, kicks, and jeers of his fellow-workmen in a manner accordant with his assumed character. He was put from one occupation to another, having apparently just sense enough to make him worth the pittance which he received. Meanwhile he lost no opportunity of observing the processes and working apparatus; and on returning home each evening he formed models of the several kinds of implements, and made memoranda of the processes. He continued this practice for nearly two years, until he ascertained that no further information was likely to be obtained, when he availed himself of a fit of sickness to continue at home; and this was represented as very malignant, as a means to prevent any person visiting him. After his recovery, the Elers seemed to have a suspicion that he was too clever for them, and he was discharged: but they soon found that he had taken their secret with him; and they had the mortification to see the Burslem potters avail themselves of methods which they thought rested with themselves.

Such is the tradition. Those who have read much on the history of manufactures will call to mind many parallel instances in which men have feigned illness or stupidity as a means of discovering processes otherwise kept secret. There may be a little colour of romance thrown over the story; but there is no reason to doubt the main points.

Thus step by step did the manufacture spread, the establishments increasing in number as new kinds of ware became introduced. Topographically considered, this extension travelled southward; for Burslem, the parent pottery-town, is nearly at the northern extremity of the district. Twyford and Astbury commenced manufactories at Shelton, about three or four miles from Burslem, and there carried on the red porcelain work, and the white ware glazed with salt. Some years afterwards Mr. Astbury's name became connected with another singular adventure, by which another step was made in the progress of the manufacture. While on a journey to London, on horseback, Astbury was compelled to seek a remedy for the eyes of his horse, which seemed to be rapidly going blind. The 'ostler of an inn near Dunstable burned a flint-stone till quite white, pulverized it, and blew a little of the dust into the eyes of the horse, by which they were made to discharge copiously. Astbury, having noticed the white colour of the calcined flint, the ease with which it was then reduced to powder, and its clayey nature when discharged in the moisture from the horse's eyes, immediately conjectured that it might be usefully employed to render of a different colour the pottery he made. On his return home, he availed himself of his observation, and soon obtained a kind of ware exhibiting marked improvement on the pre-existing kinds. Mr. Porter remarks, that "it could have been no common mind which led Astbury to the long-continued pursuit of his object by means so humiliating; and which also enabled him, on the occasion just related, to seize upon a fact thus accidentally presented, and which, although of high importance to his art, might have passed unheeded before the eyes of many a common-place manufacturer."

We next come to the era of Mr. Josiah Wedgwood, who was to the pottery manufacture what Watt was to the steam-engine and Arkwright to cotton-spinning—its greatest improver. The pottery district of Staffordshire owes to this remarkable man a large measure of its wealth and of its commercial importance. We find various items in the history of the potteries during the early half of the last century, in which the names of Mr. Aaron Wedgwood, Mr. Thomas Wedgwood, and Mr. John Wedgwood are mentioned: these were potters, apparently in rather humble circumstances, in and near Burslem. Thomas was said to have been an excellent 'thrower' at the wheel, while John was a skilful 'fireman' in the glazing department; and both left their father, Aaron Wedgwood, to set up for themselves in Burslem. It was about a century ago when the two brothers established themselves; and they soon created a large business by the industry and sagacity with which they sought out the most improved clays and glazes for their wares.

Josiah Wedgwood, the most distinguished of the family, was the son of Thomas, and was born in Burslem, in 1730. His early education was very limited; and at the age of eleven he worked for his father as a 'thrower.' An old man, many years afterwards, used to relate that he had been engaged by Thomas Wedg-

wood to make 'balls' (as the lumps of clay are called) for the two sons, Josiah and Richard, which they, as throwers, formed into vessels, the two youths being seated in the two corners of a small room. Some years afterwards Josiah Wedgwood joined in partnership with one Harrison of Newcastle, and afterwards with a Mr. Whieldon; but he appears to have returned to Burslem about 1760, and to have there set up in business on his own individual resources. He established two manufactories at Burslem, where he made knife-handles, green tiles, imitative tortoiseshell and marble plates, white stone-pottery, and other articles. He next turned his attention to 'cream-coloured' ware, for which he had soon such a demand that he built a third factory. After a time Wedgwood opened a warehouse in London, for the management of commercial dealings, and as a depôt for articles contributory to that remarkable style of manufacture which he soon struck out. He collected vases, busts, cameos, intaglios, medallions, seals, and other works of art; and began to exercise his ingenuity in imitating them in pottery or porcelain. His imitations of Greek, Roman, and modern Italian productions were so exquisite, that he gained renown throughout Europe; and men of taste were accustomed to visit Burslem to see the operations of his establishment. The Barberini or Portland vase will always be closely connected with the name of Wedgwood, as showing what the potter's art can effect. This celebrated vase being put up to auction, Wedgwood was very desirous of buying it as a pattern from whence to manufacture copies. The Duchess of Portland "bid" for it; but Wedgwood bid against her so pertinaciously, that it attracted the Duke's attention; who, when he knew the cause of Wedgwood's solicitude, offered him the loan of the vase for an indefinite period, if it would terminate his biddings. He did so; and the vase was sold to the Duchess for nearly two thousand guineas. Such is the account given by Mr. Shaw. Wedgwood thereupon employed the finest modellers and the most talented workmen in every branch, through whose aid he produced fifty copies of the vase, which he sold for fifty guineas each: as a speculation it failed, but it raised his name to a high pitch of eminence as a tasteful manufacturer.

Meanwhile he did not neglect the more useful varieties of earthenware. He presented to Queen Charlotte some specimens of painted cream-coloured ware; which so pleased the Queen, that she ordered a complete table-service of the same kind: the pattern selected was thereafter known as the 'Queen's pattern,' and the ware as the 'Queen's ware,' while Wedgwood himself received the appointment of 'Potter to the Queen.' He next invented a much admired ware known as Jasper-ware: this was a beautiful white ware, capable of receiving rich and pure colours on any part of its surface, by which striking imitations could be produced of various kinds of ancient works of art. A kind of black ware, called Black Egyptian, was also by him applied to the making of busts and figures.

By the year 1777 a canal, the 'Grand Trunk,' had been opened for the conveyance of the pottery from the Staffordshire district to the two great northern ports of the kingdom, Liverpool and Hull. But at the time Wedgwood commenced his labours the means of conveyance were miserably insufficient. In some instances the flint used in the manufacture was carried from the mill where it was ground to the manufactories by men; in other instances, by horses, who carried tubs holding two pecks each. The chapmen, or dealers, kept gangs of horses which carried small crates; and in these crates was stowed the ware, to be carried from place to place, and exhibited to purchasers. Afterwards, when the roads became improved under the provisions of an act of parliament, carts and waggons were substituted for pack-horses; and persons travelled from place to place for orders, instead of the goods being hawked about for sale. At length the Grand Trunk Canal was boldly projected by Brindley; Wedgwood advocated it earnestly, and, as it is said, turned up the first clod of earth with his own hands, near his works at Burslem.

When the canal opened a communication between the potteries and various parts of England, Wedgwood removed from Burslem, and built a large manufactory on the banks of the canal; near which he also built an elegant house for himself, and a village of neat dwellings for his workpeople; calling the whole *Etruria*, after the ancient Italian state which produced such beautiful specimens of earthen vases, &c. Here Mr. Wedgwood continued to reside till his death; and here his descendants still carry on the business which he founded. This handing down of manufacturing establishments from father to son has been very observable in the potteries. The large works at Stoke, now the property of Messrs. Copeland and Garrett, were owned by three generations in succession of Josiah Spode's, the first of whom was contemporary with the first Josiah Wedgwood; and the other pottery towns, Burslem, Hanley, Shelton, Fenton, &c. can most of them exhibit similar examples.

Beyond this point we need not trace the history of the Potteries. The celebrity of Wedgwood and the exertions of other manufacturers, together with the gradual introduction of printed ware, porcelain, &c., raised the Potteries to a commercial rank which they have ever since maintained.

Let us see, then, what kind of a district this is, which has, *par excellence*, acquired the name of 'The Potteries;' a name so distinctive, that when the parliamentary boroughs were remodelled in 1832, the franchise was given to the whole of this district as one borough, since which time there has been an "honourable member for the Potteries," although, nominally, the borough is designated by one of its towns, Stoke. Supposing a visitor to approach the Potteries by the Grand Junction Railway, and to pass through Newcastle-under-Lyme towards Stoke, he will arrive at the district about midway between its two extremities: Tunstall, Burslem, Cobridge, Hanley, and Shelton will be to the north; Fenton, Lane Delph, Lane End, and Longton will be southward; and to whichever direction he may turn, he will not be slow in observing that the towns consist mainly of small houses, in streets branching out from the high road, which runs from north to south. There are not many handsome buildings, and still fewer monuments of antiquity; but, on the other hand, there are very few indications of squalor and wretchedness. Nearly every person throughout the district lives directly or indirectly by the manufacture of pottery; and as this branch of manufacture is subject to less fluctuation than many others in the north, the instances of extreme poverty are rare. There is no living in cellars and hovels; nor is there any congregating of twenty or thirty families in one house, as some of our large towns exhibit: the houses are small and humble, it is true, but they exhibit indications of comfort which show that a large amount of wages must be distributed weekly among the seventy thousand inhabitants of the district.

Pottery is not a domestic manufacture; that is, it is not carried on in the houses of the workmen or in small shops; it is conducted in large manufactories: so that the three features which the district mainly exhibits are—the manufactories themselves, the private dwellings of the proprietors, and the streets of small houses inhabited by the workpeople The manufactories are

distinguishable by large, lofty, dark-coloured structures, shaped somewhat midway between a sugar-loaf and a bee-hive; these are the ovens in which the ware is baked; or rather they are 'hovels' which surround the ovens, and within which the men stand to attend to the ovens. Every establishment has these 'hovels,' and the extent of the operations is in some degree indicated by the number of them. Frequently, in walking along the high road, we may see a handsome private dwelling, with 'hovels' and other buildings behind it; in such case the probability is that the house is inhabited by the proprietor of the works. If a stranger ask a question concerning these manufacturing premises, he will be told that it is "Mr. So-and-so's bank"—the pottery-works being known technically as 'banks'—why, we cannot say. "Whose premises are those yonder?" "That's Mr. Wedg'ood's bank at Trury," was the reply; for Etruria is stripped both of its beginning and its end by the workpeople.

The village just named, Etruria, is situated a little out of the main road through the potteries. It is in the road from Newcastle to Hanley, and consists almost entirely of one street, containing about a hundred and fifty houses; these were built by Mr. Josiah Wedgwood, and are occupied chiefly by persons employed in the neighbouring works. A singular uniformity is exhibited by these dwellings, both in their outward appearance and their interior arrangements. The street door opens directly into the front parlour; in fine weather the door is always open, and, in almost every case, the first object which meets the eye of a passer-by in each house is a chest of drawers, immediately opposite the door. Now, without discussing the question how far a chest of drawers is a test of respectability, it is always observable that many comforts are collected around a family which possesses this article of furniture: it shows that there are "Sunday clothes" to be taken care of, and a decent pride in their preservation. The windows too, one and all, are decked with flowers, planted in pots which would put to shame the coarse red flowerpots of a London window-sill.

There is one external mark by which the pottery operatives are to be known, all the way from Tunstall to Lane End—in the 'banks,' on the road, and at the doors of their own houses. This is the small, drab felt, close-fitting, hemispherical skull-cap, which is worn by most of the men and boys. The manufacture of these caps is largely carried on at the neighbouring town of Newcastle; and they are worn because they are cheap, and because, as it is asserted, they "keep the head warm in winter and cool in summer."

At all the various towns, there are 'banks,' or pottery manufactories, on a very large scale, as well as others of a smaller size. In some of these establishments the very finest kinds of porcelain are manufactured; in others only the common earthenware; while others again combine both classes of productions. At Lane End, besides a few establishments of the higher class, there is a very large number of minor 'banks,' where the commonest kinds of stone and yellow ware are produced, and whence the hawkers and street-dealers all over England obtain their supply. Near here too, as well as in many other parts of the Pottery district, there are coal-pits, from which is procured, for six or eight shillings per ton, an abundant supply of coal well fitted for the pottery ovens, although not equal to the South Staffordshire coal for open fires. At a little village near Tunstall all the cottagers seem to have their "coal-cellars" in the open air; for the coals are thrown down in the front of each house by the side of the door, and thence carried in as wanted.

The structures which can correctly be termed "public buildings" are but few in the Potteries. Churches, chapels, market-houses, and town-halls are the principal. In a small street in Shelton there is a neat building appropriated as a "Pottery Mechanics' Institution." It was established by a few noblemen and some of the chief potters of the district some years ago, and has a small lecture-room, a library, and class-rooms for various branches of instruction.

Such are a few of the external characteristics of the district. Let us next witness the internal, by paying a visit to one of the establishments which serve as centres of industry to this busy population. It matters little where we make our selection, for the arrangements and operations are very similar in all. But having been kindly permitted by Messrs. Copeland and Garrett to inspect their works at Stoke, we will there take up our station.

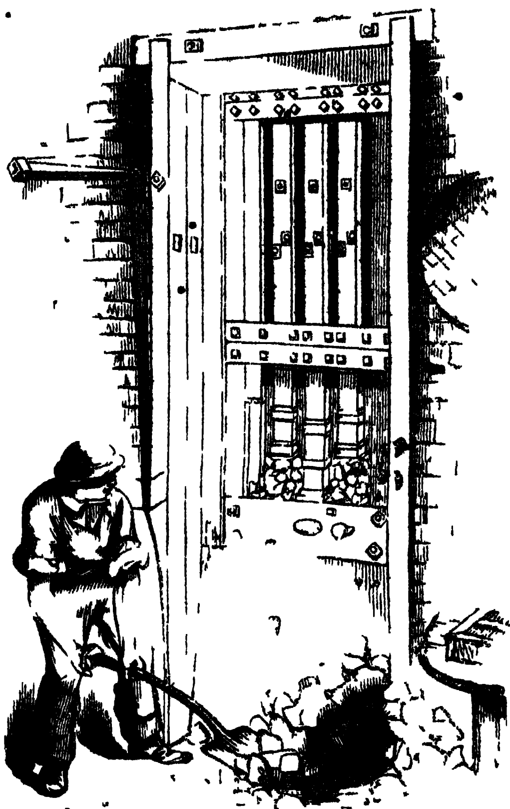
These works are, we believe, at the present day, the largest in the Pottery district: they give employment to nearly a thousand persons, and appear more like a small town than a manufactory. A very long range of windows in a brick building on the high road through Stoke, indicates the front of the works, and a gateway gives entrance to the interior. When inside the gates there is presented to the eye not one large isolated building, as in some factories—not a quadrangular area, surrounded on all four sides by buildings, as in some other cases—but a labyrinth of passages and courts, intersecting each other at all angles, and bounded by buildings. The buildings are, however, not confusedly mingled, but are divided into certain groups or compartments, according to the branch of manufacture carried on therein. One of these is the 'dish-makers' square;' that is, an open area surrounded by buildings, in which the makers of dishes work. Then there are the 'plate-square,' the 'saucer-square,' the 'coloured-body square,' the 'printer's-square,' &c., each comprising a court or area encircled by buildings. One, too, called the 'black bank,' affords an illustration of the nomenclature spoken of before; this being a 'bank,' or series of workshops, where black ware is made. Altogether there are nearly a hundred and twenty separate workshops, in which people are employed upon almost every variety of pottery and porcelain. There are in different parts of the works seven 'biscuit-ovens,' for baking the ware after it has been formed into vessels; fourteen 'glaze-ovens,' for firing the ware after the glaze has been applied to it; and sixteen kilns for enamelling and other processes. The department of the works appropriated as the porcelain manufactory surrounds a large neatly gravelled area, and is much cleaner than most other parts of the works.

When we have passed beyond the buildings where the manufacture is conducted, we come to an open piece of ground bounded by the canal. Here, scattered in huge heaps, we see the crude materials from which the porcelain and pottery are to be made. The *chert*, for the floor of the grinding-mills; the *gypsum*, or *sulphate of lime*, to make plaster moulds for casting; the *flints* from Gravesend and Northfleet, as one material for pottery; the Staffordshire *marl*, for forming the seggars, or fire-cases; the Devon, and Dorset, and Cornwall *clays* and *stones*, employed in the manufacture; and the *coals* with which the ovens and kilns are to be heated. All these are brought to the works by the canal, which is connected with other canals leading to Liverpool, to which port all the mineral products from Devon, Dorset, Cornwall, and Kent are brought in the first instance, and thence sent by barges to the Potteries. It is a curious circumstance that at the present day the Staffordshire clay is not employed for any of the pottery: it has been entirely superseded by the clays of other districts, and is now only used to

make the seggars it is a kind of marl found interstratified with the coal, and is easily procured. These works are supplied with coal from collieries belonging to the same proprietors at Fenton, a short distance from Stoke, but independent of these collieries the works at Stoke occupy an area of ten or twelve acres.

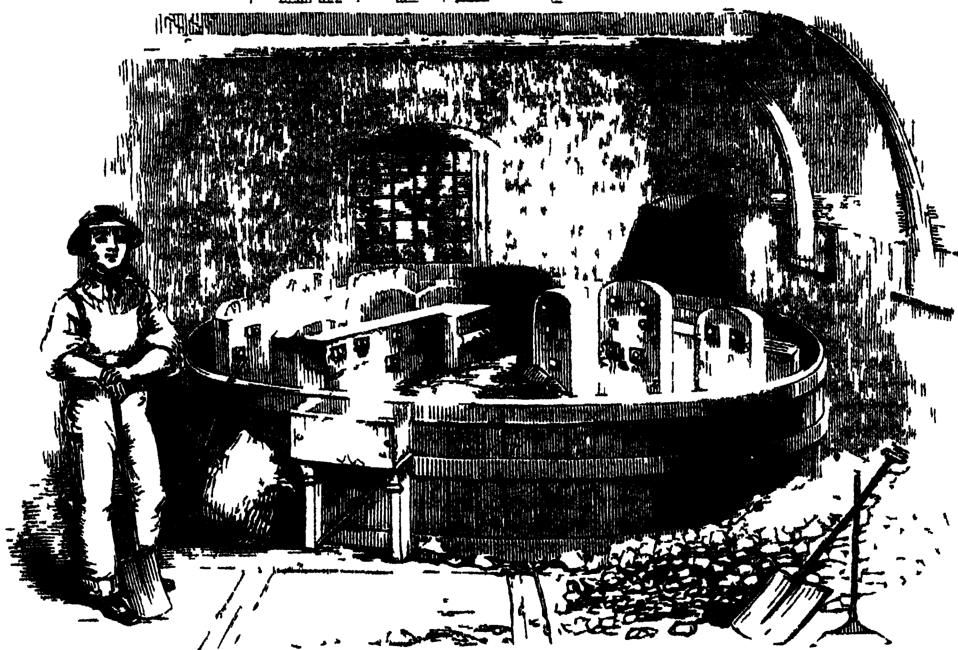
The operations carried on within the various buildings whose arrangement we have described comprise the whole series incidental to the manufacture of pottery and porcelain, from the calcining and grinding of the flint, to the printing, the enamelling, the gilding, &c. There are in various parts of the Pottery district 'flint-mills,' situated generally where there is water-power, and employed solely for grinding the flint required by the smaller manufacturers. But at these works all the flint is calcined in a kiln and ground in a mill within the establishment. In noticing these arrangements we shall be able, by referring to our recent Supplement on the Porcelain Manufacture at Worcester, to confine ourselves mainly to matters not treated there; so that the two papers together will give a tolerably complete view of the manufacture.

Flint and a few kinds of clay form the main ingredients of all the numerous varieties of pottery and porcelain, and are made fit for the potter's use by nearly the following processes:—The flints brought from Gravesend in irregularly shaped pieces are placed in a kiln shaped somewhat like a lime-kiln, where they are stratified with layers of small-coal. Heat is applied, and the flints are burned or calcined to a white colour, in which state they are more easily broken than before. These pieces are then pounded to still smaller fragments by the 'stampers' represented in the annexed cut, and which act in a curious manner. These stampers are perpendicular pieces of wood loaded with iron, and fall upon or into a box, whose bottom consists of a strong iron grating: they are raised alternately by machinery connected with a steam-engine, and made to fall heavily upon the pieces of calcined flint, which become thereby broken small enough to fall through the iron grating. The flinty



[Flint crushing.]

fragments are then ground to a perfectly fine state in the large vat or vessel here represented, designated the mill. It is a circular vessel, twelve or fourteen



[Flint grinding.]

feet in diameter, having four arms extending from its centre, which arms carry round what, in another form of the machine, would be the upper millstone. The bottom is lined or paved with Welsh 'chert,' a species of flint; and the arms carry round large heavy blocks of the same substance, by which the calcined and crushed flint, after being thrown into the vessel and covered with water, is found to be a consistence nearly as fine as cream.

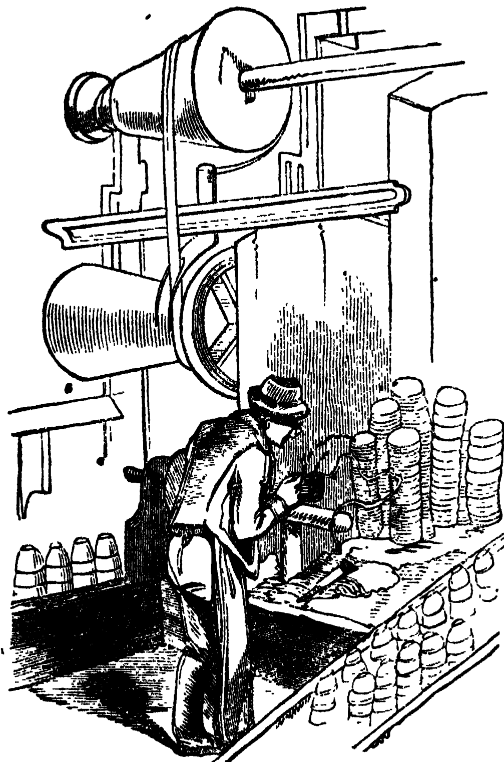
The Cornish clay is partially prepared in Cornwall from a kind of decomposed granite, called Cornish stone, which is ground and washed, and the lighter argillaceous particles allowed to flow into channels and pits, where a sediment forms, which is afterwards made into cakes, and then barrelled for shipment to Liverpool. The Dorset clay receives hardly any preparation before it arrives at the Potteries. The sulphate of lime, from which the plaster of Paris for the moulds is to be produced, is first broken small, then ground fine in a mill similar to a flour-mill, and placed in a trough formed of fire-brick: heat is then applied, by which the sulphate loses its crystalline form, and assumes the well-known appearance of plaster of Paris.

All these operations are preparatory to the 'slip-making,' the process whereby the clay is brought into the state fit for the potter's use. Whether clay be for the finer kinds of porcelain or for earthenware, the arrangements for 'slip-making' are analogous in their character, and are represented in our frontispiece. The materials travel downwards, from one level or stage to a lower one, and then to a lower one again, in the course of preparation. Each kind of clay and flint is beaten up, in a distinct vessel, with water, into a sort of cream, by means of rotating arms worked by machinery. The proper thickness of this cream is estimated by the number of ounces which a pint of it will weigh, each kind having a recognised weight known by experience to be best fitted for the object in view. These different creams then flow into large tanks, and from thence along troughs into other tanks, where they are mixed together; gauge-marks being used to afford a guide as to the quantities mixed together. Taps or valves are provided, through which the mixture falls into very fine silk lawn sieves, which have a reciprocating motion given to them by machinery: the fineness of this lawn (for the best porcelain) is such that there are three hundred threads to the square inch; and the cream thereby becomes reduced to an extremely fine state by the time it has passed through the sieves.

This mixture, then, is called 'slip,' and we follow this slip to the 'slip-kiln,' a remarkable and very long building. This place consists of a low room a hundred and twenty feet in length, having on either side shallow slip-kilns and a passage down the middle. The kilns are merely open troughs, sixty feet long, eight wide, and one deep, formed of fire-brick, and heated with flues underneath. Here the 'slip,' or clay-cream, remains exposed to heat for twenty-four hours, by which it evaporates to the stiffness of clay.

One more process is necessary before the clay is ready for the potter. When taken from the slip-kiln it is not sufficiently smooth and homogeneous, but requires a kind of annealing or kneading. This used, in the early history of the manufacture, to be performed by laborious manual operation; but a very ingenious and effective kind of apparatus is now employed for this purpose. It consists of an inverted conical machine, down the centre of which runs an axis provided with knives or cutters. The clay, being put into this machine, is cut and pressed so as to become thoroughly amalgamated, and finally forced through an aperture in the bottom of the machine.

The clay, being thus prepared, is transferred to the 'plate-maker's square,' the 'dish-maker's square,' the 'throwing-room,' or to any of the numerous workshops where the potters are employed. How the general process of 'throwing' is effected, by which the greater number of earthenware vessels are made, we gave an illustrated description in the former paper, and also of the mode in which the 'handle-maker' proceeds. We may therefore pass over these operations here, and notice one or two others. The 'turner,' it will be seen from the annexed cut, works at a lathe in a manner



[Pottery-turning.]

very similar to the turner in wood: the 'thrown' and partially-dried vessel is fixed to the chuck of the lathe, and by means of iron and steel tools of various shapes, the turner gives symmetry of form and smoothness of surface to the vessel.

Plate-making, dish-making, and saucer-making constitute very large departments of the manufacture, and in such works as are now engaging our attention each department is wholly distinct from the others. One of the plate-makers is represented in the next cut, which will illustrate the following description of making a plate:—Beneath the workman's hands is a vertical pillar, on the top of which is a horizontal wheel bearing a reverse copy of a plate made in plaster of Paris; that is, the upper surface is the same size and shape as the inside or face of the plate which is to be made. The workman, having beaten out a piece of clay to nearly the required thickness and diameter, lays it upon the plate-mould, places this mould on the horizontal wheel, and bids his attendant (a lad) set it into rotatory motion by means of a winch-handle. While the mould and clay are rotating, he presses the latter down upon the former with a wet sponge, and then proceeds to give the contour to the upper surface of the clay (to form the *bottom* of the plate) by means of gauges, ribs, or profiles. The plate



[Plate-making.]

is thus formed in a very short time: the plaster mould giving the one surface and the gauge the other.

Dishes, saucers, and all flat vessels of which one side is scarcely seen, are made in a similar manner, the least important side, generally the bottom, being formed by means of the gauges or patterns, while the surface which is to be visible is shaped by means of the plaster-mould. The plates, &c. are not removed from their respective moulds directly they are made; they are put into drying-stoves, mould and all; then taken out and trimmed smooth by passing the profile-gauges again over them; again stoved, and then separated by the contraction of the clay. But when both surfaces of a flat vessel, such as in the more ornamental kinds of porcelain, are to be visible, the vessel is generally moulded on both sides by a more complicated process. The room where some of these articles are dried is no less than a hundred and forty feet in length, and is known technically as the 'green-house,' or the place where the ware is placed when in the 'green' state.

How the ware is brought from the 'green' state to the 'biscuit' state, was sufficiently explained in the former paper, and renders any detailed description unnecessary here. The manufactured vessels, whether thrown at the wheel, or pressed, or cast in moulds—whether of earthenware or of porcelain, are placed in seggars, or fire-cases, as a means of protection from smoke, and these seggars are placed in the biscuit-ovens which are so numerous at these works. Four hundred tons of coal per week are required to heat these ovens and the other parts of the working apparatus.

The 'biscuit-warehouse,' in which all the ware is temporarily deposited after being 'fired' in the ovens, is very striking to a stranger, from its large size, and the enormous piles of ware always lying there. To give an idea of the appearance, we will describe one group which came under our notice. Whoever has been to Woolwich Arsenal must have seen the piles of cannon-balls lying in symmetrical array, all pyramidically arranged. Imagine then, plain white basins instead of cannon-balls, each one lying in the hollow of another to make the mass solid and compact; and further imagine *four thousand dozens* of similar vessels all thus arranged into a pyramid: this will give an idea of one of the singular heaps in the room. The stock in this room or warehouse is constantly undergoing change; for as one portion is removed to undergo the finishing processes, another portion is brought from the ovens to be warehoused.

The manner in which earthenware is commonly decorated is strikingly different from that adopted with respect to porcelain. The decorations in porcelain, as was pretty fully explained in the former paper, are produced by painting, with camel-hair pencils, various devices on the porcelain, the paint or pigment being formed of mineral colours, which are afterwards made to adhere permanently to the porcelain by the heat of the annealing-kiln. In pottery, however, a cheaper and more expeditious mode is adopted. One kind is called gold or silver *lustre-ware*. To produce the metallic lustre on the surface of this ware, certain metallic oxides are mixed up with essential oils to the consistence of a paint, and then applied with a brush over the surface of the vessel: the heat of a kiln afterwards dissipates some of the component ingredients, and leaves the metallic lustre visible; but the metals employed are merely substitutes for gold and silver, not the costly metals themselves.

Another variety, called 'dipped-ware,' receives its decorations in a manner so remarkable as to form one of the most curious operations of a pottery. It is a cheap kind of ware which is thus ornamented, and may be known by the fanciful but rather indefinite devices on the surface, in three or four different colours; the device being raised somewhat above the general level of the surface, but similar to it in texture. After the vessel has been turned it is fixed to a wheel, which is made to rotate while the workman effects the operation. We will suppose that the vessel is to have a device in three colours, brown, yellow, and blue: in such case the workman prepares three kinds of clay, coloured to the proper tint, and brought to the consistence of paste or cream by admixture with water. A portion of these three he puts into a kind of funnel having three compartments, so that all three remain separate, and yet flow out of three adjoining apertures at the bottom simultaneously. This funnel the workman holds over the vessel while revolving, in such a manner that a little stream of tri-coloured paint shall drop upon it, and form bands, stripes, spots, curves, or spirals, according to the manner in which the funnel is held and the velocity with which the vessel rotates. The three colours are contiguous, and flow in a united stream from the funnel; yet they are perfectly distinct in their position in the vessel. The vessel, it will be understood, is on its side, and rotating on a horizontal axis. The quickness with which this process is effected is quite astonishing, and the whole affair demands singular dexterity in the workman.

Perhaps in the whole range of the pottery manufacture, there is no kind of decorative operation which has been more generally approved, or which has tended more to give neatness to the appearance of the manufactured articles, than that of 'blue-printing,' or the transference to the ware of a device previously printed on a piece of paper from an engraved copper-plate. Before the introduction of this kind of ware there were two kinds, called 'blue-painted' and 'black-printed' wares: the former having merely a small border or edging round each vessel, painted in blue colour with a pencil; and the latter having a device

transferred to the glazed ware by a kind of printing. But both were in time superseded by the method of 'blue-printing.'

The arrangements for 'blue-printing' are simply as follow:—The designer in the first place draws a design, corresponding in size to the size of the vessel to be printed. In the early stage of the system no fine lines were introduced into the design; but coarse unmeaning patterns, such as the 'willow' pattern, were alone employed. By degrees, however, a better taste prevailed, and landscapes and other pleasing subjects were introduced. The design, when finished, is given to an engraver, who engraves it on a flat copper-plate in the usual manner. From the plate so engraved impressions are taken upon a peculiar kind of thin paper, made expressly for this purpose by Messrs. Fourdrinier, who have a paper-mill in the immediate vicinity of the Potteries. The colour, for the impression, is a mixture of certain metallic oxides with oil, and is brought to the thickness of a cream. The engraved plate is placed upon a flat stove; and, when heated, the printer rubs the ink well into the device, as seen in the annexed cut. With a knife he then



[Printing Blue ware.]

scrapes off the superfluous ink from the surface, and rubs the plate quite clean, leaving ink only in the engraved device. Meanwhile the paper has been moistened in soap and water; and an impression is then taken by means of a small roller-press.

Immediately that the printed paper is ready, it is handed to a woman called a 'transferrer,' who, in the manner here sketched, lays it down upon the plate or other earthenware vessel which is to be printed. Sometimes it can be put on in one piece; while at other times it is cut into a few pieces by another female, and then adapted to the various curvatures of the vessel. The transferrer next takes a kind of rubber, formed of a roll of flannel wrapped round the end of a stick, and rubs the paper very forcibly down upon the vessel, the coloured surface being next to the vessel;



[Transferring the Print.]

this rubbing is so violent, that if the paper were not of a tough quality (though thin), it would be worn into holes. The ware, being in the porous 'biscuit' or unglazed state, imbibes the colour from the paper. The vessel is immediately handed to another female, who immerses it in cold water, and washes off all the paper from the surface. It is then seen that the ware has imbibed the colour so intimately that the washing away of the paper has not removed it from the ware: the device is perfectly transferred. The ware is placed in a kiln, to drive off the oil from the ink; and the printed vessel is then ready for the process of glazing. Thus is effected the decoration of a kind of ware, the introduction of which, to use the words of Mr. Porter ('Treatise on Porcelain'), "has added materially to the decent comforts of the middle classes in England, and has more than any other circumstance contributed to the great extension of our trade in earthenware with the continent of Europe."

At the Works which have been engaging our attention the most costly kinds of porcelain are largely manufactured, as well as the commoner but more generally used kinds of earthenware; and the splendid show-rooms belonging to the establishment richly illustrate the state of excellence to which this branch of manufacture has arrived. But the Supplement (No. 700) to which reference has before been made will render it unnecessary here to detail the train of processes involved in the manufacture of porcelain. Suffice it to say that porcelain constitutes a notable branch of the operations conducted in the Staffordshire Potteries: operations by which the manufacturing reputation of England has been greatly heightened; by which sixty or seventy thousand persons earn their daily food; and by which a busy district has been peopled—not only to the extent which warranted the parliamentary franchise given to them—but with a class of persons as favourably circumstanced, perhaps, in a social point of view, as any body of manufacturing operatives in the country.



SIR ROGER DE COVERLEY.—No. V.

[From the 'Spectator,' Nos. 115 and 116.]

After what has been said, I need not inform my readers that Sir Roger, with whose character I hope they are at present pretty well acquainted, has in his youth gone through the whole course of those rural diversions which the country abounds in; and which seem to be extremely well suited to that laborious industry a man may observe here in a far greater degree than in towns and cities. I have before hinted at some of my friend's exploits: he has in his youthful days taken forty coveys of partridges in a season; and tired many a salmon with a line consisting but of a single hair. The constant thanks and good wishes of the neighbourhood always attended him on account of his remarkable enmity towards foxes: having destroyed more of those vermin in one year than it was thought the whole country could have produced. Indeed the knight does not scruple to own among his most intimate friends, that, in order to establish his reputation this way, he has secretly sent for great numbers of them out of other counties, which he used to turn loose about the country by night, that he might the better signalise himself in their destruction the next day. His hunting-horses were the finest and best managed in all these parts. His tenants are still full of the praises of a gray stone-horse that unhappily staked himself several years since, and was buried with great solemnity in the orchard.

"Sir Roger being at present too old for fox-hunting, to keep himself in action, has disposed of his beagles, and got a pack of stop-hounds. What these want in speed, he endeavours to make amends for by the deepness of their mouths and the variety of their notes, which are suited in such a manner to each other, that the whole cry makes up a complete concert. He is so nice in this particular, that a gentleman having made him a present of a very fine hound the other day, the knight returned it by the servant with a great many expressions of civility; but desired him to tell his

master, that the dog he had sent was indeed a most excellent bass, but at present he only wanted a counter-tenor. Could I believe my friend had ever read Shakspere, I should certainly conclude he had taken the hint from Theseus in the 'Midsummer Night's Dream:'

> 'My hounds are bred out of the Spartan kind,
> So flew'd, so sanded; and their heads are hung
> With ears that sweep away the morning dew.
> Crook-kneed and dew-lapp'd like Thessalian bulls,
> Slow in pursuit, but match'd in mouths like bells,
> Each under each. A cry more tuneable
> Was never holla'd to, nor cheer'd with horn.'

"Sir Roger is so keen at this sport, that he has been out almost every day since I came down; and upon the chaplain's offering to lend me his easy pad, I was prevailed on yesterday morning to make one of the company. I was extremely pleased, as we rid along, to observe the general benevolence of all the neighbourhood towards my friend. The farmers' sons thought themselves happy if they could open a gate for the good old knight as he passed by; which he generally requited with a nod or a smile, and a kind inquiry after their fathers or uncles.

"After we had rid about a mile from home, we came upon a large heath, and the sportsmen began to beat. They had done so for some time, when, as I was at a little distance from the rest of the company, I saw a hare pop out from a small furze-brake almost under my horse's feet. I marked the way she took, which I endeavoured to make the company sensible of by extending my arm; but to no purpose, till Sir Roger, who knows that none of my extraordinary motions are insignificant, rode up to me and asked me, if puss was gone that way? Upon my answering yes, he immediately called in the dogs, and put them upon the scent. As they were going off, I heard one of the country fellows muttering to his companion, 'that 'twas a wonder they had not lost all their sport, for want of the silent gentleman's crying, stole away.'

"This, with my aversion to leaping hedges, made me withdraw to a rising ground, from whence I could have the pleasure of the whole chase, without the fatigue of keeping in with the hounds. The hare immediately threw them above a mile behind her; but I was pleased to find, that instead of running straight forwards, or, in hunter's language, 'flying the country,' as I was afraid she might have done, she wheeled about, and described a sort of circle round the hill where I had taken my station, in such a manner as gave me a very distinct view of the sport. I could see her first pass by, and the dogs some time afterwards unravelling the whole track she had made, and following her through all her doubles. I was at the time delighted in observing that deference which the rest of the pack paid to each particular hound, according to the character he had acquired among them. If they were at fault, and an old hound of reputation opened but once, he was immediately followed by the whole cry; while a raw dog, or one who was a noted liar, might have yelped his heart out without being taken notice of.

"The hare now, after having squatted two or three times, and been put up again as often, came still nearer to the place where she was at first started. The dogs pursued her, and these were followed by the jolly knight, who rode upon a white gelding, encompassed by his tenants and servants, and cheering his hounds with all the gaiety of five and twenty. One of the sportsmen rode up to me, and told me, that he was sure the chase was almost at an end, because the old dogs, which had hitherto lain behind, now headed the pack. The fellow was in the right. Our hare took a large field just under us, followed by the full cry in view. I must confess the brightness of the weather, the cheerfulness of everything around me, the chiding of the hounds, which was returned upon us in a double echo from two neighbouring hills, with the hallooing of the sportsmen, and the sounding of the horn, lifted my spirits into a most lively pleasure, which I freely indulged because I was sure it was innocent. If I was under any concern, it was on account of the poor hare, that was now quite spent, and almost within the reach of her enemies; when the huntsman getting forward, threw down his pole before the dogs. They were now within eight yards of that game which they had been pursuing for almost as many hours; yet on the signal before mentioned they all made a sudden stand, and though they continued opening as much as before, durst not once attempt to pass beyond the pole. At the same time Sir Roger rode forward, and alighting, took up the hare in his arms, which he soon after delivered up to one of his servants, with an order, if she could be kept alive, to let her go in his great orchard, where it seems he has several of these prisoners of war, who live together in a very comfortable captivity. I was highly pleased to see the discipline of the pack, and the good nature of the knight, who could not find in his heart to murder a creature that had given him so much diversion."

"The walls of his great hall are covered with the horns of several kinds of deer that he has killed in the chace, which he thinks the most valuable furniture of his house, as they afford him frequent topics of discourse, and show that he has not been idle. At the lower end of the hall is a large otter's skin stuffed with hay, which his mother ordered to be hung up in that manner, and the knight looks upon with great satisfaction, because it seems he was but nine years old when his dog killed him. A little room adjoining to the hall is a kind of arsenal filled with guns of several sizes and inventions, with which the knight has made great havoc in the woods, and destroyed many thousands of pheasants, partridges, and woodcocks. His stable-doors are patched with noses that belonged to foxes of the knight's own hunting down. Sir Roger showed me one of them, that for distinction's sake has a brass nail struck through it, which cost him about fifteen hours' riding, carried him through half a dozen counties, killed him a brace of geldings, and lost above half his dogs. This the knight looks upon as one of the greatest exploits of his life."

MONTS-DE-PIÉTÉ, OR PAWN SOCIETIES.

An important item in the history and condition of the working classes is that which relates to *temporary* loans; to the borrowing on the part of a person in want of immediate assistance of a small sum of money, for which a pledge or security is given, and interest paid. It is not generally known how much attention this subject has received from popes, cardinals, emperors, kings, and governments generally; nor is it often suspected how vast is the sum of money annually lent under such circumstances.

There are many passages in the Bible which have had much influence in the arrangements connected with this matter. For instance, in Exodus, xxii. 25, it is commanded: "If thou lend money to any of my people that is poor by thee, thou shalt not be to him as an usurer, neither shalt thou lay upon him usury;" and in Deuteronomy, xxiii. 20, is this passage: "Thou shall not lend upon usury to thy brother; usury of money, usury of victuals, usury of anything that is lent upon usury: unto a stranger thou mayest lend upon usury; but unto thy brother thou shalt not lend upon usury." Commentators have discussed at

considerable length the acceptation in which the terms "brother" and "stranger" ought to be received; and also the meaning attached here to the word "usury," whether it means interest in any shape, or only exorbitant interest. In the early ages of the church these considerations influenced the arrangements made for the temporary relief of those who required loans.

In a simple state of society lending money or goods is generally an act of charity or benevolence; but as society advances in complexity, these borrowings become so numerous as to give rise to a regular branch of trade, which seems to find its own proper level much in the same manner as other trades, the lender receiving, under the name of *interest*, a remuneration for his trouble and the use of his property. Even when such a practice was severely prohibited by the Papal court, the people still had recourse to it secretly; for their own temporary wants were more powerful than Papal decrees. At length, finding that the borrowing of money was a feature almost inseparable from a mixed state of society, the popes endeavoured to found a system somewhat similar to one that had been acted on by the Romans. The emperor Augustus converted into a fund the surplus of the money which accrued to the state from the confiscated property of criminals; and lent sums from it without interest to those who could pledge value equal to double the amount. Tiberius is said to have advanced a large capital, from which those were supplied with money for three years who could give security on lands equivalent to twice the value. Lastly, Alexander Severus lent money at a low rate of interest to some parties; and to the poor he lent money without interest to purchase lands, agreeing to receive payment from the produce of them.

The popes wished to establish a system of lending money on pledges without interest, and sought to create funds for this purpose. They granted favours and privileges and indulgences to such wealthy persons as would contribute towards the capital fund. But it was soon found that it was hopeless to expect that the borrowing of money on interest from money-lenders could be stopped by this system; for such a result could only be obtained by advancing sums—not only to those who were poor, in the strictest sense of the word, but to those also who, to secure themselves from poverty, wished to undertake and carry on useful employments, and who for that purpose had need of capital. Beckmann, who investigated this subject with his usual sagacity, says, "Even if a lending-house should not be exhausted by the maintenance of its servants and various accidents that could not be guarded against, it was still necessary at any rate to borrow as much money at interest as would be sufficient to support the establishment. As it was impossible that it could relieve all the poor, the only method to be pursued was to prevent their increase by encouraging trade, and by supplying those with money who wanted only a little to enable them to gain more, and who were in a condition and willing to pay a moderate interest. The pontiffs, therefore, at length resolved to allow the lending-houses to receive interest, not for the whole capitals which they lent, but only for a part; merely that they might raise as much money as might be sufficient to defray their expenses; and they now, for the first time, adopted the long-established maxim, that those who enjoy the benefits should assist to bear the burden, a maxim which clearly proves the legality of interest."

The lending-houses were thereupon permitted to borrow money at moderate interest, in order to supply a fund whence to lend small sums on pledges; but as there was still a distrust as to the propriety of this interest, the accounts relating to it were blended in the general expenses of the establishment, without appearing too conspicuous; and it was called by the name of *indemnity*, in order to avoid the use of a word in bad odour. But this did not escape scrutiny. One class of ecclesiastics arrayed themselves against another, and fiercely contested the point whether it was proper to do anything wicked, as receiving interest was by some deemed, in order that good might follow.

The period when this system was established in Italy appears to have been about the middle of the fifteenth century. It would seem that at about that time the Jews and the Christian bankers or money-lenders demanded exorbitant interest, and that this circumstance drew more than common attention to the matter. Barnabas Interamnensis, a Franciscan friar, proposed to raise a capital by collections, in order to lend from it on pledges to the indigent, who should give monthly, for the use of the money borrowed, as much interest as might be necessary to pay the servants employed in the establishment. An able jurist of Perugia approved of the plan, and both of the projectors applied to the superior authorities to know whether such a system could be allowed. The answer was favourable, and a considerable sum was soon collected by preaching. Other parties, however, and especially the Dominicans, fiercely attacked the system as usurious; and thence ensued a wordy war between the Franciscans and the Dominicans. But when Pope Leo X. gave his sanction to it, the opponents were obliged to relax in their proceedings. It is supposed that this took place in the year 1464; and at the end of the year, after all expenses were paid, a considerable surplus was found remaining; this was divided among the servants, to whom no fixed salaries had been awarded.

Lending-houses, on the principle just detailed, were established successively at Perugia, Orvieto, Viterbo, Savona, and other places in Italy. Pope Sixtus IV., in a "bull" which sanctioned the lending-house at Savona, regretted that the great expenses to which he was subjected did not permit him to relieve his countrymen with money; but stated that he would grant to the lending-house so many spiritual advantages as should induce the faithful to contribute towards its support; and that it was his desire that money should be lent from it to those who would assist gratis during a year in the business which it required. If none could be found to serve on these conditions, a moderate salary was to be given. He added a clause also respecting pledges.

The Franciscans were the active agents through whom these lending-houses were successively established. One of them, being a good orator, was employed by his order to travel through Italy and preach. The chief object of his sermons was to banish gaming, intemperance, and extravagance of dress; but he, above all, attacked the Jews, and excited such a hatred against them, that the governments in many places were obliged to intreat or even to compel him either to quit their territories or not to preach in opposition to these unfortunate people, whom the crowds he collected threatened to massacre. By the exertions of this man and others of his order, lending-houses were by degrees established at Assisi, Mantua, Florence, Parma, Cesena, Aquila, Chieti, Lieti, Narni, Lucca, Piacenza, Verona, Milan, Padua, Bassano, Feltri, Pavia, Brescia, Modena, and Bologna, comprising some of the most important cities in Italy. The Franciscans had many difficulties to contend against. For instance, at Florence the rich Jews bribed the government, who wished, in appearance, to favour the establishment of a lending-house, while they secretly thwarted it; and some boys having once proceeded, after hearing a sermon, to attack the houses of the Jews, the Franciscans were ordered to abstain from preaching and to quit the city. At Vicenza, in

order to avoid the reproach of usury, the artifice was employed of not demanding any interest, but admonishing the borrowers that they should give a remuneration according to their piety and ability: people were by these means induced to pay more interest than was legally required at other lending-houses, and the system was therefore shortly prohibited.

It was not without the most persevering opposition that these lending-houses were founded; bulls, decrees, and councils being repeatedly brought to bear against the attacks of the Dominicans. In the ecclesiastical writings of this period the lending-houses are called by the name of *montes pietatis*, afterwards transformed, in Italian and French, to the equivalent names *monti di pietà* and *monts de piété*, implying mounts or banks of piety. This name is supposed to have been given in order to impart a religious sanction or character to these establishments.

The first lending-house in the city of Rome was established in 1539, and the first at Naples in 1540. With respect to the latter, two rich citizens, Aurelio Paparo and Leonardo di Palma, redeemed all the pledges which were at that time in the hands of the Jews, and offered to deliver them to the owners without interest, provided they would return the money which had been advanced on them. Other opulent persons followed their example; many bequeathed large sums for this purpose; and the viceroy, who drove the Jews from the kingdom, supported it by every available method. Beckmann, writing about the end of the last century, thus spoke of the Mont de Piété at Naples:—"This lending-house, which has indeed undergone many variations, is the largest in Europe; and it contains such an immense number of different articles, many of them exceedingly valuable, that it may be considered as a repository of the most important part of the moveables of the whole nation. About the year 1563 another establishment of the like kind was formed under the title of *banco de' poveri*. At first this bank advanced money, without interest, only to relieve confined debtors; afterwards, as its capital increased, it lent upon pledges, but not above the sum of five ducats, without interest."

In an account of one of the monti di pietà, published in 1689, the following is described as having been the object and management of the institution:—"The sacred monte di pietà has for its object the advance of sums of money, in each case not exceeding thirty crowns, to poor and necessitous persons of every description, on the security of pledges. This is accomplished, as individuals actuated by benevolent motives supply funds to the institution, or, apprehensive of danger if they retain money at home, deposit it with the establishment for greater security. The pledges, which are taken from day to day, are retained eighteen months, after which, if the owner fails to claim them, they are sold publicly and fairly by auction. The proceeds are applied to satisfying the claims of the establishment, including interest at two per cent., and the surplus is returned to the owner of the pledge. The institution is governed by a fraternity, which every year elects forty of its members as directors. The directors meet weekly, to deliberate on all that is required for the maintenance of the establishment."

In other countries of Europe the Lombards were the principal persons who lent money on the security of pledges. They were merchants of Lombardy, who by degrees established branch-banks in most of the cities of Europe; they were in fact the forerunners of the bankers of the present day, and the name of "Lombard Street" may be taken to represent the street where they chiefly congregated. But it does not appear that in Germany or in England lending-houses, on the principle of the monts de piété, were ever established.

In a recent volume of the 'Archæologia,' Sir Henry Ellis has brought into notice a curious document contained in the Lansdown MSS. It is a proposition for the establishment of a mont de piété in England, put forth in the reign of Charles I. It sets out by saying that "In every commonwealth, citty, and towne whatsoever, there are never wanting infinite numbers of the poorer sort of tradesmen, yea, of rich men alsoe, which at some time or other stand in neede of money; and cannot subsist unless there bee some that may lend money unto them, either upon bonds or paunes, for the supplying of their several necessityes. Wicked and uncharitable men have, in all places and countreys, taken advantage of the wants of these men, and exacted exceeding excessive usury; but noe country whatsoever hath ever suffered soe long and soe much as ours here in England."

The document proceeds to assert that the money-lenders of that day charged from 30 to 80 per cent. interest for small loans; and that "fishwives, oyster-women, and others that doe crye things up and doune the streets," borrowed trifling sums at even 400 per cent. interest. After mentioning that Italy possessed her monti di pietà, as a means of correcting this evil, and that it was desirable to establish similar institutions in England, the promoters of the scheme enter very fully into all the advantages and alleged disadvantages. Monti di pietà are divided into three classes:—1st, where the loans are made to the poor without any interest charged, out of funds given or bequeathed by charitable persons; 2ndly, where the stock is created by a tax upon the community generally; and 3rdly, where the stock is created partly by donation and partly by tax. The plan proposed for such a "Mont" in London is then set forth. A sum of 100,000*l*. is said to be necessary to furnish a bank or stock, and this is to be borrowed at interest. Out of the money thus procured, a large house would have to be built for depositing the pawns or pledges; and the wages of the servants and officers would also be paid from this source. To reimburse the projectors for the money borrowed from the original lenders, a rate of interest would be charged to the pawners, sufficient to effect this, and to pay all the current expenses of the establishment. Then follow many pages of earnest declaration, supported by quotations from numerous divines and civilians, that this is not, and cannot be, and ought not to be termed, *usury*. An attempt is then made to show that great and manifest advantages would result to cities and towns, to the commonwealth at large, and to the sovereign, from this plan. But it does not appear that any further steps were taken in the matter.

Haydn's Childhood.—The father of this great man was a wheelwright in a sequestered Austrian village; and exercised, besides, the functions of sexton and organist to the village church. "He had a fine tenor voice, was fond of his organ, and of music in general. On one of those journeys which the artizans of Germany often undertake, being at Frankfort-on-the-Maine, he learned to play a little on the harp; and on holidays, after church, he used to take his instrument, while his wife sang. The birth of Joseph did not alter the habits of this peaceful family. The little domestic concert came round every week; and the child, standing before his parents with two pieces of wood in his hands, one of which served him as a violin, and the other as a bow, constantly accompanied his mother's voice. Haydn, when loaded with years, and with glory, often recalled the simple airs which he had sung—so deep and indelible an impression had those first melodies made on his soul." It would not be difficult to find in Yorkshire such families as those of the good wheelwright, and such domestic concerts as those which awoke the genius of his illustrious son. Out of some family of this sort, too, an English Haydn might have sprung, were a musical education as generally accessible in England as it is in Germany.—*G. Hogarth.*



[Hedgehogs in their Spring Clothing.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

The Hedgehog (*Erinaceus Europæus*).

Among the smaller mammalia of our island the Hedgehog is by no means one of the least interesting, whether we consider its structure or its habits. In almost every part of the country this little animal is common, frequenting woods, copses, orchards, and dense hedge-rows, where it lies concealed from morning till dusk, evening being its "opening day," when it rouses up from slumber and begins its prowl for food. Often have we watched it rambling about in the woods on the approach of dusk, "what time the timorous hare limps forth to feed," when it is all alertness and alive to every sound. It pads along, more quickly than might be supposed, in a vacillating manner, yet when surprised, it makes no attempt to escape by flight, but rolling up itself into the form of a ball, trusts to its panoply of thorns and awaits the result. While in this position, the head, legs, and tail are completely hidden and protected, and the animal may be rolled about, or even roughly treated, without being made to unfold itself; nay, the more severely it is attacked, the more pertinaciously does it maintain its defensive form, and the more firmly does it contract. Thus does it offer a passive resistance, and often a successful one, to its enemies, of which the fox is among the most resolute, and to which, in spite of all its efforts, it often falls a prey. In order to enable the hedgehog to assume a globular figure, and envelop itself in its thorny covering, it is endowed with a set of cutaneous muscles, which exhibit an admirable instance of the adaptation of animal mechanism to a specific purpose. By the contraction of these muscles not only is the animal rolled up, but by means of a circular muscle round the margin of the dorsal integument the thorn-clad skin of the back is drawn up like the mouth of a pouch or purse, so as to shut in the head and limbs, the whole being thus enveloped. The quickness with which the hedgehog throws itself into this attitude is very surprising, and from the strength and elasticity of the spines it may fall thus folded from a great height without being injured. Mr. Bell informs us that he has frequently seen a hedgehog in his own possession run towards the precipitous wall of an area, and without hesitation or a moment's pause for preparation throw itself off, at the same instant contracting into a ball, in which condition it reached the ground from a height of twelve or fourteen feet, when, after a few moments, it would unfold itself, and run off unhurt. The Hedgehog is omnivorous in its appetite, feeding on insects, slugs, mice, frogs, eggs, fruits, and roots. In consequence of its fondness for insects it is often kept in a domestic state, rendering good service by the destruction of cockroaches and crickets, in quest of which it quits its retreat at the approach of night and traverses the floor in every direction. It darts forward with rapidity on these insects and catches them with its mouth, never using its paws for that purpose, and very speedily and audibly masticates them. Pallas affirms that it will eat the blister-fly with impunity, a very few of which would soon terminate the existence of any other animal in extreme torture.

Hedgehogs have at all times been cruelly persecuted by the ignorant and brutal. It is alleged against them that they drain the udders of the cows reposing in the meadows at night, give them sore diseases, or stop their milk entirely; and not only so, but that they rob the orchard, rolling themselves over apples or other fruit fallen from the trees, and carrying away their prize sticking to their spines.

These charges are altogether preposterous, and we need not gravely enter into a statement of the physical impossibility in the former case, resulting from the

structure of the mouth, for surely no one who reflects for a moment can give credit to such an absurdity. We have however heard it strenuously asserted, nor did any argument convince to the contrary. That the Hedgehog often creeps close to slumbering cattle may be admitted, the little creature being attracted either by the warmth of the cow or by the insects which swarm round cattle, and if the udders of the cows drip, it may even sip the milk, a fluid to which, when kept tame, it is partial, but that it drains the udder or otherwise injures the cow is an absurdity which stupid ignorance alone can entertain. The same charge has been alleged against the Fern-owl, or Goatsucker (*Caprimulgus*), which unquestionably is sometimes seen in a situation equally suspicious; its object however is not to suck the cow, but to catch the flies, an occupation in which Mr. Waterton has frequently observed it engaged during moonlight summer evenings.

That the hedgehog in autumn devours a fallen apple, being partly fructivorous, and frequents orchards at that season when the fruit ripens and drops from the tree, is not to be doubted, but that it carries off apples and hoards them up is a mistake, for the animal lays up no provision for the winter. The injury done by hedgehogs to the vegetable produce, whether of the farm, orchard, or garden, is, however, but very trifling; indeed Mr. White, in 'The Natural History of Selborne,' states that, in his opinion, they are rather useful than detrimental. "They abound," he says, "in my gardens and fields. The manner in which they eat the roots of the plantain in my grass walk is very curious; with their upper mandible, which is much longer than their lower, they bore under the plant, and so eat off the root upwards, leaving the tuft of leaves untouched. In this respect they are serviceable, as they destroy a very troublesome weed, but they deface the walks in some measure by digging little round holes."

Although the hedgehog is, as we have stated, incapable of performing those acts for the supposed commission of which it is cruelly persecuted, it is guilty of others not very generally known or attributed to it, which, it must be confessed, are not such as to render it a universal favourite. It is quite certain that it preys upon the eggs of pheasants, partridges, and of all kinds of domestic poultry to a considerable extent; and if the following anecdote, published in a York paper a few years since, and communicated to us by the late Mr. Woods, be true, this animal is rather a formidable enemy to the preserve, and even poultry-yard. At Hazelwood, the seat of Sir Edward Vavasor, Bart., a fine brood of partridges, which were hatched by a common hen, having been reduced to a single individual, evidently, as it appeared from the remnants of feathers and bones, by some predaceous animal, means were adopted to discover the offender; at length a hedgehog was observed one night in the act of attacking the hen herself, and some of the feathers were found in its mouth. Other instances of strong carnivorous propensities are not wanting. Bingley gives an account of one of these animals, which was fed upon raw meat and mice; of the latter it would devour six at a meal. We have ourselves seen the hedgehog fall upon frogs and ravenously devour them, and it would, from the following narrative, founded on the testimony of Professor Buckland, and given in the second volume of the 'Zoological Journal,' that the snake is not quite safe from this animal's attacks:—"Having occasion to suspect that hedgehogs, occasionally at least, preyed on snakes, the Professor (says the author of the communication) procured a common snake, and also a hedgehog which had lived in an undomesticated state for some time in the Botanic Garden at Oxford, where it was not likely to have seen snakes, and put the animals together into a box: whether or not the latter recognised its enemy was not apparent, it did not dart from the hedgehog, but kept creeping gently round the box. The hedgehog was rolled up at their first meeting, and did not see the snake. The Professor then laid the hedgehog on the body of the snake, with that part of the ball where the head and tail meet downwards, and touching it. The snake proceeded to crawl; the hedgehog started, and opened slightly, and seeing what was under it, gave the snake a hard bite, and instantly rolled itself up again. It soon opened a second time; repeated the bite, and then closed as if for defence: opened carefully a third time, and then inflicted a third bite, by which the back of the snake was broken. This done, the hedgehog stood by the snake's side, and passed the whole body of the snake successively through its jaws, cracking it, and breaking the bones at intervals of half an inch or more; by which operation the snake was rendered entirely motionless. The hedgehog then placed itself at the tip of the snake's tail, and began to eat upwards, as one would eat a radish, without intermission, but slowly till half the snake was devoured, when the hedgehog ceased from mere repletion. During the following night the anterior half of the snake was also completely eaten up."

When taken young the hedgehog may be completely tamed and familiar, allowing itself to be handled, and associating with the dog or cat upon terms of perfect concord. It feeds indifferently upon bread and milk, meat, &c., and keeps up a regular nocturnal chace after insects.

Few animals sink into a more profound lethargy during their state of hybernation than the hedgehog. On the approach of winter it seeks its retreat—some hole under the roots of a tree, or similar situation—where it makes a soft nest of moss and leaves, in which it rolls itself, so as to attach a great quantity of the material to its spines. We have seen hedgehogs taken from their winter dormitory which resembled a ball of matted leaves, these entirely enveloping the rolled-up animal, which formed, as it were, the living centre.

It is not till the spring has fairly set in that this animal awakes from its trance, and comes abroad; it then wanders in search of its mate. The female produces young in June: they are usually from three to five in number, about two inches in length, blind, perfectly white, and, although naked, the rudiments of the spines, as yet soft and flexible, are apparent; in the course of five or six days the spines have acquired considerable development and hardness, but it is not until a more advanced age that the young animals are capable of folding themselves up in their thorny mantle. The nest is formed with considerable skill and attention to the comfort of the young, and the root or upper covering is capable of throwing off the rain so as to preserve the interior dry. The female is devoted to her offspring, as will appear from the following fact communicated to us:—In the garden of a gentleman from whom our informant received the account, one of these animals had made her nest and littered. She was accustomed to pass into a neighbouring copse for food every night after dark; but by some accident one evening the garden door was closed earlier than usual; her return at the customary time was consequently prevented, and the poor creature was discovered the next morning lying dead close to the door, having expired through maternal anxiety, combined with her violent and unsuccessful efforts to pass the fatal barrier. The young were afterwards found dead, starved for want of food.

The flesh of the hedgehog, which is still eaten in some parts of the Continent, was formerly in esteem

in our country, and was reckoned in season in the month of August. The usual mode of dressing it was, we are informed, to roast it, or bake it in a pie. "This diet," says the author of the 'Journal of a Naturalist,' "was pronounced dry and not nutritive, because he putteth forth so many prickles. All plants producing thorns, or tending to any roughness (continues this writer), were considered to be of a drying nature, and upon this foundation the ashes of the hedgehog were administered as a great dessicative" in some diseases. In Pliny's time the gall of the hedgehog mixed with bats' brains was esteemed as a depilatory; and Albertus Magnus gravely states that oil in which one of its eyes has been fried, if kept in a brass vessel, will endow the human eye with the faculty of seeing as well by night as in the day.

By the ancients the thorny skin of the hedgehog was used in hackling hemp for the weaving of cloth, and in the present day it is still occasionally employed for the same purpose: we have seen muzzles, for the purpose of weaning calves, made of them.

According to some zoologists, there exist in Europe two varieties of hedgehog, the common or swine hedgehog (hérisson-porceau) and the dog-hedgehog (hérisson-chien), the latter differing from the former in having a shorter and thicker nose, and the mantle of spines less extensive. Desmarest, however, assures us that he never saw one of this kind dead or alive, and that the only figure of it is by Perrault, who considered it a distinct species, which no naturalist has hitherto been able to verify. Ray doubted its existence, as do most modern naturalists.

The hedgehog belongs to the Insectivorous order of Mammalia: the head is small: the cheeks and forehead are covered with brownish grey hairs; the nose is almost naked, and of a black colour, and terminated by a round pig-like snout; the nostrils are protected by small valves or flaps of integument, which prevent the entrance of sand or dust into the delicate organ of smell whilst the animal is burrowing for food. The eyes are prominent, but small and black, and the pupils are circular. The ears are rounded, and so short as to be concealed by the fur. The sides, throat, chest, and belly are covered with long coarse hair of a chestnut brown intermingled with grey, which lies smoothly. The tail is nearly naked and scaly, and externally does not exceed an inch in length. The upper part of the head, and the whole of the back, which is broad and arched, are covered with sharp spines of a brown colour, tipped with yellowish white, and having a dark ring rather below the middle. The feet are naked and black, and completely plantigrade, the whole of the sole resting on the ground. The length of the adult animal is from nine to ten inches.

The hedgehog is spread over every part of Europe, except the cold countries, as Lapland, Norway, &c.

THE SHEEP-FLOCKS OF SOUTHERN RUSSIA.

In a recent article we noticed the peculiar features of the horse-farms of Southern Russia; and we now give a short account of the still more numerous herds of sheep which roam over the 'steppes,' or plains of the Asiatic portion of the empire. The works by Kohl and Tooke on Russia, and the 'Asiatic Journal,' will be our chief authorities.

It was stated in the former article, that many of the Russian nobles derive a considerable portion of their revenues from their herds of horses. But the sheep are yet more valuable to them; and this fact is intimated by the circumstance, that when the wealth of a noble is mentioned, it is often estimated by the number of sheep which he possesses. Some individuals are said to possess no fewer than a hundred thousand sheep. These sheep are mostly of the Wallachian breed, celebrated for the huge size of the tail, which consists of little else than a mass of fat; but within the last few years Merinos have been introduced and successfully reared. There are two varieties of the fat-tailed sheep: the one, being the true Wallachian has a tail which assume a shape something similar to that of a pear, swelling at both sides to an enormous size, and tapering to a point at the extremity; while the other, which is a Kalmuck variety, does not really carry its fat on the tail, but rather in two huge cushions, from thirty to forty pounds in weight. In both these varieties the fat in or about the tail is considered more valuable than that obtained from any other part of the animal.

The keeper of a large flock of these sheep is called a *tschabawn*. He is a much more quiet and peaceable being than the *tabuntshik*, who looks after the herds of horses. As the former is not obliged to range over so wide an extent of country as the latter, he is able to carry about with him many comforts, which the latter may never hope to obtain. The tschabawn has usually one or two waggons drawn by oxen, in which he carries with him his provisions and cooking utensils, together with the skins of sheep that die, and those of the wolves that he has been fortunate enough to kill.

The plains of Russia, like those of Australia, increase year after year in the number of sheep reared on them. But the Russian sheep are exposed to much more severe privations than those of the more favoured country. The scorching heats of summer and the piercing blasts of winter are alike tremendous to them; while the hurricanes which occasionally burst over the plains are nearly as bad as either During these hurricanes the poor animals make not the least attempt to resist the violence of the storm, but run away in a perfect panic before the wind, and are forced by thousands into the streams and ravines by which the steppes are intersected. Neither the shepherds nor their dogs are of much value at these times: but goats render very valuable services. With every hundred sheep three or four goats are invariably associated. The sheep alone could never be brought to face the terrible wind of the plain or to march into a ravine; but the goats are easily brought to face any wind that will at all bear facing; they lead the way boldly down the most rugged descents, and the sheep then follow these leaders without much apprehension.

The flocks of sheep, which are called *ottara*, are placed under some sort of shelter during the winter months; although this shelter is so miserably insufficient that the poor animals become worn to skeletons by the time spring arrives. The summer months are passed upon the open plains; and the movements of the whole herd form a picturesque sight The tschabawn selects his resting spot according as it furnishes grass and water for his sheep. If he comes to a fine pasture-ground, he seldom leaves it till the grass has been eaten away; and even when on the march, his encampment for the night is often only two or three miles from the spot whence he started in the morning. The order of progress is tolerably uniform and simple. The tschabawn's baggage-waggon usually leads the van; the tschabawn follows it; and the sheep follow him. The sheep, it is said, "are no early risers, and love not to have their morning meditations interrupted till the night dew has dried away and fitted the grass for their enjoyment. The taste of the sheep is the very reverse of the horse's. The latter never enjoys his meal more than at night; while the former likes to keep good hours, and seldom stirs from his bed till morning, but passes the witching hours by a careful repetition of the last day's studies in the science of mastication."

So long as the weather is mild and enemies are absent, the proceedings of a tschabawn and his flock are tolerably comfortable. But this state of things is seldom of long continuance. Wolves are very numerous on the steppes; and it requires all the vigilance of the keeper to preserve his flock from their voracious attacks, but, on the other hand, as the skin of a wolf is always a valuable prize, the shepherd is often not ill-disposed to meet with such an enemy. A snow-storm, however, is an opponent of a very different kind, and is generally productive of very distressing results. When Kohl, the German traveller, was in these regions a few years ago, an old Russian tschabawn gave him the following account of a snow-storm to which he and his flock had been once exposed:—

"We were once grazing the ottara of a rich Bulgarian. It was in the steppe of Otshakoff; and there were seven of us, with two thousand sheep and a hundred and fifty goats. The month was March, and we had just driven out for the first time: the weather seemed mild, and there was some grass already on the ground, so that we dreamed of no mishap. In the evening it began to rain, and the wind was bitter cold. Soon the rain turned to snow, and our wet cloaks were frozen as hard as boards. A few hours after sunset we had a regular Siberian *vyuga* (snow-drift) from the north-east, whistling about our ears till seeing and hearing became equally impossible. We had not got far from home yet, so we tried to find our way back, but it was impossible to make the sheep face the wind; and even the goats, who will face anything but a vyuga, were beginning to run before the storm: to keep the flock from scampering away was impossible; all we could attempt was at least to keep them together. In this way we had to race it all night, and in the morning nothing but snow was to be seen around us. The vyuga raged all that day, and the poor sheep were more wild and frightened even than during the night. Sometimes we gave up all as lost, but then we roused ourselves again, and ran with the screaming bleating flock, while the oxen trotted after with the waggon, and the dogs came howling behind. The poor goats were all lost or frozen to death the very first day, on which we ran at least fifty or sixty versts [a verst is about three-quarters of an English mile], leaving a track of dead sheep behind us the whole way. In the evening the poor beasts ran less wildly, for they were fairly exhausted with hunger and fatigue. We also were knocked up. Two of our party reported themselves sick, and crept under the mats and skins in the waggon, while the rest of us had only time to take a little bread and snow to sustain life. Night came, but no house or home was anywhere to be seen, for the Otshakoff steppe is one of the wildest countries in the world. That night was worse than the first, and as we knew the storm was driving us right upon the coast, we expected every moment to be blown, with all our stupid flock, into the sea. Another of our men fell sick, so we packed him in the waggon along with the rest. We all thought that night would have been our last. About morning the wind luckily shifted about, and drove us towards some houses, that we were able to distinguish through the drifting snow, but though they were not more than thirty feet away from us, it was quite impossible to make the foolish sheep turn aside. On they went right before the wind, in spite of all we could do, and we soon lost sight of the houses; but the good people had heard the howling of our dogs, and guessed what was the matter. They were German colonists, and some fifteen or twenty of them came to our help, and then we managed to stop the sheep and drive them under the sheds and into the houses. We had lost all our goats and about five hundred of our sheep, but many of the poor things died after we got them under shelter, for in their fright they kept so close together that many were smothered. We thanked God and the good Germans for our safety; for half a verst farther we should have come to the coast, rising twenty fathoms high above the sea. The Germans did all they could to make us and our sick men comfortable; but some of us were a long time before we recovered from the effects of that bout."

The scene just depicted is one of the most gloomy to which the tschabawn and his flock are exposed. In fine weather their proceedings are much more pleasant. When the shepherd comes to a piece of good grazing-ground, he pitches his camp, and avails himself of all the little comforts which his baggage-waggon affords. His little kitchen is immediately put into order. One kettle is appropriated to boil food for himself and his men; while another is appropriated to the dogs, kept principally as a means of repelling wolves. While one of the party acts as cook, another has perhaps been stripping the skin off a dead sheep, another has been attending the sick members of the dumb flock, while several others employ themselves in milking, for there are often five or six hundred sheep in one flock in milk. The milk thus collected is placed in wooden vessels, exposed to the sun, and converted into a kind of cheese known by the name of *brinse*. This cheese, as soon as the whey has been drained off, is packed in goat-skins with the fur turned inside: the skin gives it a peculiar flavour, but this is one of its chief recommendations to the dwellers on the Russian plains.

When the evening meal is done, if the weather be fine, the men and dogs stretch themselves out for an hour or two before a blazing fire of dry reeds and grass, the shepherds discussing such subjects as their monotonous mode of life may afford. The arrangements for the night are then made. The waggon is the lodging of the principal tschabawn, who there entertains any straggling guests whom he may have, for a kind of rude hospitality is shown towards any strangers whom chance or misfortune have made wanderers in those parts. The other tschabawns drive the sheep as closely together as possible, and then form with their dogs a complete circle round the flock. Each man throws his furs, that serve him for mattress and coverlet, on the spot assigned to him, and between every two beds the same measured interval occurs. The next thing is to make the beds for the dogs. This is soon done. There are as many rugs provided as there are dogs, and as each dog from custom knows his own rug, all that is necessary is to lay the rug on the spot where it is wished the dog should take up his station for the night. Thus, what with the men and the dogs, a complete *cordon* or circle of defenders surrounds the flock of sheep. A camp thus fortified is generally pretty safe against the wolf, still there are few nights pass away without an alarm, for the wolves will hover for many successive days and nights around a flock, in the hope of espying sooner or later an unguarded point, or of taking advantage of the panic into which the flock is sometimes thrown by a sudden storm.

The Camel.—The extensive use to which the camel has been applied for the purpose of military transport under the most opposite circumstances of soil and climate, in modern times, makes its neglect by the Romans the more remarkable. It is mentioned as having been used by the Parthians in their memorable campaign against Crassus to carry their reserve store of arrows. In our own times it has been found equally available and indispensable in the arid plains of Beloochistan, the mountain-passes of Cabool, and the intensely frozen snows of Khiva. Twenty-two thousand camels were brought under the walls of Vienna when Solyman besieged that city in 1529.—*Lord Francis Egerton's Mediterranean Sketches.*



[Head of Masaccio and Figure of St. Paul in the Chapel of the Carmine at Florence.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. X.

Masaccio.

It is easily conceivable that, during the forty years which Lorenzo Ghiberti devoted to his great work, and others on which he was employed at intervals, the assistance he required in completing his own designs, in drawing, modelling, casting, polishing, should have formed round him a school of young artists who worked and studied under his eye. The kind of work on which they were employed gave these young men great superiority in the knowledge of the human form, and in effects of relief, light and shade, &c. The application of the sciences of anatomy, mathematics, and geometry to the arts of design began to be more fully understood. This early school of painters was favourably distinguished above the later schools of Italy by a generous feeling of mutual aid, emulation, and admiration among the youthful students, far removed from the detestable jealousies, the stabbings, poisonings, and conspiracies, which we read of in the seventeenth century. Among those who frequented the atelier of Lorenzo were Paolo Uccello, the first who applied geometry to the study of perspective; he attached himself to this pursuit with such unwearied assiduity, that it had nearly turned his brain, and it was for his use and that of Brunelleschi that Manetti, one of the earliest Greek scholars and mathematicians in modern Europe, translated the 'Elements' of Euclid; Maso Finiguerra, who invented the art of engraving on copper; Pollajuolo, the first painter who studied anatomy by dissection, and who became the instructor of Michel Angelo; and Masolino, who had been educated under Starnina, the best colourist of that time.

There was also a young boy, scarcely in his teens, who learned to draw and model by studying the works of Ghiberti, though not considered as his disciple, and who, after a while, left all the rest far behind him. He had come from a little village about eighteen miles from Florence, called San Giovanni, and of his parentage and early years little is recorded, and that little doubtful. His name was properly Tommaso Guido; or, from the place of his birth, Maso di San Giovanni; but from his abstracted air, his utter indifference to the usual sports and pursuits of boyhood, his negligent dress and manners, his companions called him *Masaccio*, which might be translated, *ugly* or *slovenly Tom*; and by this reproachful nickname one of the most illustrious of painters is now known throughout the world and to all succeeding generations. Masaccio was one of those rare and remarkable men whose vocation is determined

beyond recall almost from infancy. He made his first essays as a child in his native village; and in the house in which he was born they long preserved the effigy of an old woman spinning, astonishing for its life-like truth. Coming to Florence when about thirteen, he studied (according to Vasari) under Masolino, who was then employed on the frescoes of the chapel of the Brancacci family, in the church of the Carmelites. Masolino died soon after, leaving his work unfinished; but Masaccio still continued his studies, acquiring the principles of design under Ghiberti and Donatello, and the art of perspective under Brunelleschi. The passionate energy and forgetfulness of all the common interests and pleasures of life with which he pursued his favourite art obtained him, at an early age, the notice of Cosmo de' Medici. Then intervened the civil troubles of the republic: Cosmo was banished; and Masaccio left Florence to pursue his studies at Rome with the same ardour, and with all the advantages afforded by the remains of ancient art collected there.

While at Rome, Masaccio painted in the church of San Clemente a Crucifixion, and some scenes from the life of St. Catherine of Alexandria; but, unhappily, these have been so coarsely painted over, that every vestige of Masaccio's hand has disappeared—only the composition remains; and from the engravings which exist some idea may be formed of their beauty and simplicity.*

Cosmo de' Medici was recalled from banishment in 1433; and soon afterwards, probably through his patronage and influence, the completion of the chapel in the church of the Carmine, left unfinished by Masolino, was intrusted to Masaccio.

This chapel is on the right hand as you enter the church; it is in the form of a parallelogram, and three sides are covered with the frescoes, divided into twelve compartments, of which four are large and oblong, and the rest narrow and upright. All represent scenes from the life of St. Peter, except two, which are immediately on each side as you enter—the Fall, and the Expulsion of Adam and Eve from Paradise. Of the twelve compartments, two had been painted by Masolino previous to 1415, the Preaching of St. Peter, one of the small compartments, and the St. Peter and St. John healing the Cripple, one of the largest; in this fresco are introduced two beautiful youths, or pages, in the dress of the patricians of Florence. Nothing can be more unaffectedly elegant; they would make us regret that the death of Masolino left another to complete his undertaking, had not that other been Masaccio.

Six of the compartments, two large and four small ones, were executed by Masaccio. These represent the Tribute Money; St. Peter raising a Youth to Life; Peter baptizing the Converts; Peter and John healing the Sick and Lame; the same Apostles distributing alms; and the Expulsion of Adam and Eve from Paradise.

The wood-cut at the head of the continuation of this Essay (page 225) will give some idea of the groups in one of these large compartments. The scene represented is one of the incidents in the apocryphal History of the Apostles. Simon the Magician challenged Peter and Paul to restore to life a dead youth, who is said to have been a kinsman or nephew of the Roman emperor. The sorcerer fails of course: the skull and bones on the ground are part of the machinery of his incantations. The Apostles resuscitate the youth, who kneels before them. A crowd of spectators stand around beholding the miracle. All the figures are nearly the size of life, and quite wonderful for the truth of expression, the variety of character, the simple dignity of the forms and attitudes. Masaccio died while at work on this grand picture, and the central group was painted some years later by Filippino Lippi: the figure of the youth in the centre is traditionally said to be that of the painter Granacci, then a boy. Among the figures standing round are several contemporary portraits: Piero Guicciardini, father of the great historian; Luigi Pulci, the poet, author of the 'Morgante Maggiore;' Pollajuolo, the painter, Michael Angelo's master, and others.

[To be continued.]

* In Otley's 'Early Italian School' there is an engraving of St. Catherine disputing with the Heathen Philosophers. In Rosini are others. Both these works may be consulted in the British Museum.

MONTS DE PIÉTÉ, OR PAWN-SOCIETIES.

[Concluded from page 212.]

In the former article on this subject we glanced rapidly at the past history of the Monts de Piété, or lending-houses, of the Continent. We may now notice the existing institutions.

The *Mont de Piété* of Paris, at present existing, was established by a royal ordinance in 1777; and after being destroyed at the Revolution, was again opened in 1797. Loans are made by this establishment upon deposits of such goods as can be preserved, to the amount of two-thirds of the estimated value of all goods other than gold and silver, and to four-fifths of the value of the latter. No loan is for less than three francs (2*s.* 6*d.*). The advances are made for a year, but the borrower may renew the engagement. Interest is fixed at one per cent. per month. Mr. M'Culloch, quoting from the *Bulletin des Sciences Géographiques*, gives the following account of the existing Parisian establishment:—It receives annually about 1,200,000 articles, upon which it advances from twenty to twenty-one millions of francs; it has generally from 600,000 to 650,000 articles in its possession. The expense of management amounts to from sixty to sixty-five centimes (about sixpence) for each article; so that a loan of three francs never defrays the expenses it occasions, and the profits are wholly derived from those that exceed five francs. At an average, the profits amount to about 280,000 francs, of which only about 155,000 are derived from loans upon deposit; about 125,000 being the produce of other funds at the disposal of the Company. Out of every twenty-two articles pawned, there are, on an average, eighteen redeemed during the first year, three re-pledged at the end of the year, and one forfeited and sold.

There are establishments of this kind in Dunkirk, Cambray, Douay, Lille, and Valenciennes. At these five towns, in the year 1827, the number of articles pawned in the *Monts de Piété* was nearly half a million, the money lent on which was two millions and a half of francs; and the numbers and values taken out of pledge during the year were somewhat smaller.

At the meetings of the British Association for 1840, 1841, and 1842, held respectively at Glasgow, Plymouth, and Manchester, Mr. H. J. Porter communicated to the Statistical Section a mass of very curious details relating to the *Monts de Piété* of France and Italy, and to the attempts which he had made to institute similar establishments for the benefit of the poorer classes in Ireland. These we may notice in succession.

In the year 1839, the *Mont de Piété* at Rome took in about four hundred thousand pledges, on which a sum averaging about fourteen shillings each had been lent, making a total of nearly three hundred thousand pounds sterling. The institution is divided into three branches, called Primo Monte, Secondo Monte, and

Terzo Monte. The first and second are for the reception of goods on which the amount borrowed does not exceed a *scudo* (4*s*. 7*d*.); the third is for articles of higher value. Besides this, the institution lends to the poor, without interest, sums not exceeding a scudo. The greatest amount lent in one sum, in 1839, was 2700*l*.; the least was 10½*d*. The expense of management, for which the services of one hundred persons were required, was about six thousand pounds, and the net profits between four and five thousand. The wide range between the amounts of the loans (from 10½*d*. to 2700*l*.) shows that persons moving in many different ranks of society must avail themselves of the facilities thus offered. Mr. Porter saw, among the articles in pawn, a diamond ring, a suite of pearls, a snuff box with a likeness of Louis XVIII. set in pearls, a coronation medal, and many similar articles. Valuables of this kind are almost always redeemed; very few being left to be sold.

The Parisian *Mont de Piété*, according to Mr. Porter's inquiries, exhibited the following result, as the proceedings of the year 1840:—There were nearly a million and a half of articles pledged during the year; on which a sum little short of one million sterling was lent. A hundred thousand pledges, which were neither redeemed nor renewed within the prescribed time, were sold by auction, averaging in value about thirteen shillings each. On the last day of the year there were eight hundred thousand articles remaining in pledge, on which seven hundred thousand pounds had been lent. There are generally from four to five thousand articles pawned every day; nine per cent. is charged for interest, and one-half per cent. for valuation, and the institution gives out of its profits seven or eight thousand pounds a year to the hospitals of Paris. Among the articles in pawn, there are said to be generally a quarter of a million of watches!

In order to ascertain the extent to which pawnbroking is carried on in Ireland, with a view to the introduction of Monts de Piété, Mr. Porter had recourse to an ingenious plan. He selected one whole county, that of Armagh; one large trading town, Belfast; and the metropolis, Dublin; as being likely to afford data whence calculations respecting the whole of Ireland might be made. He deposited, at every pawnbroker's in these places, an article of clothing, and received duplicates or tickets, each bearing a number on it, showing the order in which articles had been received and registered. In seven days' time he deposited another pledge at each pawnbroker's, as before, and received in like manner duplicates or tickets. By comparing the numbers on these tickets with those on the first series, he could ascertain how many pledges had been deposited in the interval of seven days; and assuming that number to be a fair average, he calculated how many it would amount to in a year. It was ascertained, by other means, that the average sum lent on pledges in Ireland generally is about 3*s*.; but in Dublin 4*s*. Taking all these facts together, Mr. Porter found that in the county of Armagh there are 222,240 pledges in a year, on which are lent 33,000*l*., on which nearly 1000*l*. is charged for duplicates or tickets alone, besides interest; and that in Dublin the number pledged is 3,820,000, on which 764,000*l*. is lent, and for which 16,000*l*. is paid for duplicates alone.

It was at the Glasgow Meeting that these startling facts were brought forward; and at the same time Mr. Porter made the following statement:—"There exists in Glasgow a system of pawning quite new to me, and I believe wholly unknown in Ireland. These are called *wee* or *little pawns*. The supposed advantages or inducements to pawn at these brokers are as follows:—they give money on articles of lesser value than the licensed pawnbrokers will receive; they give about twenty-five per cent. more on the deposits; and they are open earlier and later than the usual pawnbrokers. The manifest disadvantages are—they give no tickets, and consequently there is no security; the time for redeeming these pawns is one month, instead of one year; and the interest charged is one penny per week for one shilling, or at the rate of 433⅓*l*. per cent. per annum. I have been able to make some inquiry into the extent of business transacted by the licensed pawnbrokers in Glasgow. Having made calculations from the tickets of six of the pawnbrokers, and the amount of their transactions, ranging from twenty-eight to thirty, thirty-three, forty-two, fifty-three, and sixty-one thousand pawns annually, it may be presumed these present a fair average; and if so, the number of pawns annually lodged would be 997,832*l*., which, at one penny each for the ticket, produces 4157*l*. 12*s*. 8*d*." This number, at an estimate of 3*s*. average on each pledge, gives 150,000*l*. per annum lent by the regular pawnbrokers. Besides these, there are as many as seven hundred *wee-pawn* shops, who take on an average nearly sixty thousand pledges annually each; making forty million pledges in all, besides those at the regular pawnbrokers. "I ascertained," adds Mr. Porter, "that the sums lent on these 'wee' deposits varied from a halfpenny to one shilling, and in a few cases even above that sum; but that the average on the whole is fourpence. Now, in order to err on the safe side, I will calculate at an average of only threepence for each deposit; and the amount is, nevertheless, above *half a million* of money, lent to the very poorest and most distressed classes within the city of Glasgow and suburbs, and this sum lent out on interest of 433*l*. 6*s*. 8*d*. per cent. per annum."

When Mr. Porter had found by these personal inquiries how ruinous is the rate of interest which the very poor pay for their loans, he formed a plan for establishing Monts de Piété in Ireland. With the aid of the gentry and clergy of Tanderagee, an institution was formed, embracing a charitable pawn-office, a loan-fund, and a bank for savings; all under one administration, managed by the same board of directors. At the beginning of 1839 this Society commenced its proceedings; and in that year the articles pawned amounted to about fifteen thousand, of which eleven thousand were redeemed within the year; the amount lent was about 2000*l*., averaging pretty nearly half-a-crown on each pawn. The interest received within the year on the money lent was 110*l*. During the following year similar institutions were established at Limerick, Portadown, Belfast, Dungannon, and Coleraine. In 1842 Mr. Porter stated, that at the Monts de Piété in Ireland there had been during the year 1841 about three hundred and fifty thousand articles pledged, on which 62,000*l*. had been lent; the loans varying from thirty shillings down to one shilling.

The above details relate to loans on the security of pledges, on the principle of pawnbroking, stripped of some of its objectionable features. But besides this, Mr. Porter described the system of loan-funds in Ireland, on a somewhat different basis. This system seems to have been acted on rather extensively in Ireland in various ways. A loan-fund is a stock collected by means of deposits made by persons possessing a little money, the money being lent out at interest; and the depositors receiving the greater part of the interest thus accruing. Before loan-funds were established, the borrowers were placed under disadvantages which have been thus noticed in a Report of the Ballycastle Loan-Fund:—"It was a common practice to supply meat at a price one-third above the market. Potatoes were also supplied during the cheap season, an engagement being entered into by the buyers to pay the

summer price, whatever it might be; nor was this all, for interest was charged on the promissory notes at the rate of six per cent. Again, if a poor man required a cow or a horse, he applied to one of the money-lenders, who either purchased it for him, charging him one pound for the bargain, and sometimes more, or counted down the money asked for by way of tender, and then abstracted one pound for the compliment; in either case putting the borrower to the cost of one shilling and sixpence for the promissory note, and requiring him to pay six per cent. interest.* In like manner, weavers were obliged either to take yarn from the dealers considerably above the market-price, or if, as was often done, they borrowed twenty shillings for one month, or between two markets, to purchase yarn for themselves, they were charged one shilling at least, and frequently more, for such accommodation."

The loan-funds, instituted with a view to lessen the amount of interest thus paid by the borrowers, were, in 1841, upwards of two hundred in number in Ireland. The principal depositors were farmers holding farms from twenty to fifty acres in extent. Three hundred and thirty servants had deposited about 7000*l.* The funds thus collected, and for which interest at from five to six per cent. was paid, were advanced in loans to persons who wanted temporary assistance, but more respectable than those who would require the aid of the Monts de Piété. In 1840 there were issued loans to the number of thirty-seven thousand, and to the value of 150,000*l.*, to enable the borrowers to purchase horses, cows, pigs, &c.; while for the purchase of seed, manure, and agricultural implements there were nine thousand loans, amounting to about 30,000*l.* Other loans were for purchasing provisions, some to enable the borrower to pay rent or debts, or to embark in trade.

A loan-fund at Tyrrell's Pass is described as being productive of very favourable results: it employs an agriculturist, and furnishes seeds to farmers; it supports from its profits an infant-school, in which one hundred and twenty children are educated; it has established a platting-school for Irish Leghorn hats and bonnets, the manufacture of which from grass and rye-straw has been very much admired. A Ladies' Society is connected with the loan-fund, which distributes clothing to the poor in inclement weather. The operations of the establishment seem to partake of the united characters of a loan-fund, an industrial institution, and a charitable fund.

We are not aware that the pawnbroking transactions of London have ever been made the subject of statistical inquiry; their extent must be enormous. It may be worth while to notice that the Monts de Piété and the loan-funds, which it has been our purpose to describe, have been established mostly by societies of benevolent persons, whose aim has been the benefit of the poor rather than pecuniary profit. Much good may doubtless be done by beneficent persons undertaking to assist and guide the needy in this or any similar way; but much mischief has been done by attempting to legislate on the rate of interest, and to repress what has been called usury. Money has its price, like any other commodity, and whatever tends to drive it from the open market, to load its employment with obloquy and risk, must eventually recoil with tenfold weight upon the unfortunate borrower. There are loan-funds in other quarters, which are commercial speculations, formed by persons who act upon the general principles of trade, and in these the borrower is certain of being treated with fairness, the amount of interest being calculated according to the risk on certain fixed principles. In fact, our largest banks and life annuity societies are loan societies on a large scale.

The Climate of the South.—Our mountain expeditions are as much impeded by bad weather here as in Scotland or Ireland. The beau ideal of a southern climate is not often realized, and we are disposed to find far too much fault with our own, and particularly with that of poor dear Ireland. I can state as a positive fact, that during the various wild and mountain expeditions we made in the south and west of Ireland during the year 1838, there were not more than six days in which the bad weather at all incommoded us; whereas, in this greatly extolled south of France, we have had almost constant rain or storms ever since our arrival at Bayonne, about six weeks ago. During our expedition in Spain to St. Sebastian we had rain. In our fortnight's residence at Biaritts the mountains were very seldom visible, and it was so cold that I was obliged to have recourse to some of my winter-clothing. During the eleven days we were at Pau the mountains were only clear during a part of one; and in our day's journey from Bayonne to Pau, and the day from Pau to Bigorre, no mountain-tops were visible. The days we spent at Bigorre were likewise showery and dark; and it was only on the morning we left it that the snow-mountains appeared.—*Lady Chatterton's The Pyrenees, &c.*

A Prairie Trading Caravan.—Council Grove derives its name from the practice among the traders, from the commencement of the overland commerce with the Mexican dominions, of assembling there for the appointment of officers and the establishment of rules and regulations to govern their march through the dangerous country south of it. They first elect their commander-in-chief. His duty is to appoint subordinate leaders, and to divide the owners and men into watches, and to assign them their several hours of duty in guarding the camp during the remainder of their perilous journey. He also divides the caravan into two parts, each of which forms a column when on march. In these lines he assigns each team the place in which it must always be found. Having arranged these several matters, the council breaks up; and the commander, with the guard on duty, moves off in advance to select the track and anticipate approaching danger. After this guard the head teams of each column lead off about thirty feet apart, and the others follow in regular lines, rising and dipping gloriously; two hundred men, one hundred waggons, eight hundred mules; shoutings and whippings, and whistlings and cheerings, are all there; and, amidst them all, the hardy Yankee moves happily onward to the siege of the mines of Montezuma. Several objects are gained by this arrangement of the waggons. If they are attacked on march by the Camanche cavalry or other foes, the leading teams file to the right and left, and close the front; and the hindermost, by a similar movement, close the rear, and thus they form an oblong rampart of waggons laden with cotton goods, that effectually shield teams and men from the small arms of the Indians. The same arrangement is made when they halt for the night. Within the area thus formed are put, after they are fed, many of the more valuable horses and oxen. The remainder of the animals are 'staked'—that is, tied to stakes, at a distance of twenty or thirty yards around the line. The ropes by which they are fastened are from thirty to forty feet in length, and the stakes to which they are attached are carefully driven, at such distances apart as shall prevent their being entangled one with another. Among these animals the guard on duty is stationed, standing motionless near them, or crouching so as to discover every moving spot upon the horizon of night. The reasons assigned for this are, that a guard in motion would be discovered and fired upon by the cautious savage before his presence could be known; and further, that it is impossible to discern the approach of an Indian creeping among the grass in the dark, unless the eye of the observer be so close to the ground as to bring the whole surface lying within the range of vision between it and the line of light around the lower edge of the horizon. If the camp be attacked, the guard fire and retreat to the waggons. The whole body then take positions for defence; at one time sallying out, rescue their animals from the grasp of the Indians, and at another, concealed behind their waggons, load and fire upon the intruders with all possible skill and rapidity. Many were the bloody battles fought on the 'trail,' and such were some of the anxieties and dangers that attended and still attend the 'Santa Fé trade.' Many are the graves, along the track, of those who have fallen before the terrible cavalry of the Camanches!—*Farnham's Travels in the Great Western Prairies, Oregon Territory, &c.*



[Pointe à-Pitre, before the late Earthquake.]

GUADALOUPE.

Guadaloupe is one of the largest of the Lesser Antilles, extending in length from east to west about 40 miles, the greatest breadth being about 25 miles, lying between 15° 51′ and 16° 20′ N. lat., and 61° 10′ and 62° W. long. It is about 55 miles south of Antigua; 35 miles north of St. Domingo; and 80 miles north-west of Martinique. The island was discovered and named by Columbus, in November, 1493, and it is stated that the women, armed with bows and arrows. opposed the landing of the Spaniards, but fled immediately on hearing a discharge of fire-arms. It remained unappropriated until 1635, when a body of five hundred Frenchmen landed, and forthwith began a war of extermination upon the natives, which continued until 1640. It remained in possession of France until 1759, when it was taken by the English, but was restored to France in 1763. It was again taken by the English in 1794, and retaken in the following year. In 1810 it once more fell into the hands of the English, and was restored in 1814 at the general peace, since which time it has remained in the possession of France.

The island (correctly speaking there are two islands) is bisected by a navigable channel called *La Rivière Salée*, or Salt River, running from south to north, with a large bay at each end; that on the north is called *Grand Cul-de-sac*, and that on the south *Petit Cul-de-sac*. Between these bays the channel varies in breadth from thirty to seventy yards, and is full of islets and sand-banks. Its depth is so unequal that only vessels of small burthen can pass through it. The land to the east of this channel is called *La Grande Terre;* while that on the west, being the part first discovered and earliest settled, is more properly called Guadaloupe.

Guadaloupe proper is traversed from south to north by a chain of volcanic mountains of an average height of about 3000 feet, the most remarkable of which is *La Soufrière*, or the Sulphur Hill, 5500 feet above the level of the sea, and from which are continually vomited thick black smoke, with occasional flashes of flame. The sides of this mountain display, among the huge fragments of rock, the openings of several caverns, which are supposed to communicate with the interior of the volcano. The sides of the whole chain are well-wooded, and several small rivers find their sources therein, turning a number of sugar-mills in their descent, and bearing fertility to the soil of the plains which they water, but becoming in the rainy season furious torrents. Guadaloupe proper is the best wooded of the Antilles, with the exception perhaps of St. Lucia: there is abundance of water, and the air is mild and salubrious. On the tops of the mountains the cold is severe and vegetation scanty; but on descending, a climate is reached which is soft and temperate, where Europeans, with care, may find refuge from the attacks of the yellow fever, particularly on the eastern slopes, which are the most elevated, and the most exposed to the beneficial influence of the trade-winds, but the country at the western base, where the mountains intercept the eastern winds, is in general unhealthy and thinly populated.

La Grande Terre presents a country in general flat, watered by a few streams, scarcely sufficient for the purposes of agriculture and the consumption of the inhabitants; they make use, therefore, of pits of brackish water, and construct reservoirs and cisterns for the preservation of the rain: but the unfortunate slaves have frequently nothing to quench their thirst but the water of the ponds, which, exposed to the sun, is muddy and putrid, and engenders many diseases. La Grande Terre having no mountains, and being more thinly wooded, the rains are much less frequent than in the other division of the island, and it is also subject to greater heats and seasons of long-continued drought.

The principal objects of culture are sugar, coffee, some cocoa, and a little cotton. The produce of the colony in the year 1834 was 840,000 cwt. of sugar, 1,000,000 gallons molasses, 340,000 gallons rum, 22,500 cwt. coffee, and inconsiderable quantities of cotton and cocoa. La Grande Terre, though inferior to the Guadaloupe district in climate, is the best adapted to cultivation, and exceeds it in population and wealth. The soil, rich and fertile, and full of shells and madrepores, attests that at some period it has been covered by the sea to a date much more recent than the other part; but the almost total want of streams compels the inhabitants to use windmills for the manufacture of their sugar. The plough has been introduced into some of the cantons, but with no great success, the prejudices of the cultivators preventing its adoption. The introduction of European horses and cows has been entirely successful.

The capital of the island, St. Louis, or Pointe-à-Pitre, stands on La Grande Terre, at the south entrance of the Rivière Salée, in 16° 16′ N. lat. and 61° 36′ W. long. The harbour is sheltered and the anchorage good. The town of Basse Terre, which is in the other division of Guadaloupe, stands near its south-west point, in 15° 59′ N. lat and 61° 47′ W. long. It is an unsheltered roadstead with indifferent anchorage, and is unsafe during the hurricane season; but from its greater proximity to the most productive part of the island, it is more frequented by shipping than Pointe-à-Pitre, and is the chief commercial station of the colony.

The population of Guadaloupe in 1834, according to an official return made to the French government, was as follows:—

	Males	Females	Total
Free Persons .	13,756	14,987	28,743
Slaves . . .	46,572	50,112	96,684
Total .	60,328	65,099	125,427

The free population is divided between the towns and plantations in nearly equal proportions; while of the slaves only 12,153, or about one-eighth, reside in the towns. The number of births in 1834 was 2773, of whom 963 belonged to the free classes and 1810 to the slaves, being 1 for 16 of the free females, and only 1 for 27 of the female slaves. The number of deaths in the two classes was somewhat nearer to the proper proportions, being 887, or 1 in 32, of free persons, and 1974, or 1 in 49, of the slaves.

Like all the other Antilles, Guadaloupe is exposed to the most frightful storms, irruptions of the sea, and earthquakes. The last eruption of the sea was in 1825, which ravaged nearly all the island, the quarter of Basse Terre suffering the most, the town itself being almost entirely destroyed The last earthquake was that of February 8th. of the present year, which almost totally destroyed Pointe-à-Pitre, with a most frightful loss of life, besides damaging many other parts of the island. This earthquake extended to Antigua and some other places, but nowhere with the dreadful consequences it inflicted on Guadaloupe. A letter from that place, dated February 9, says, "All was overturned, except the wooden houses. Immediately after the shock, fires broke out in 200 or 300 places together, and totally consumed the houses. At present the flames are playing over the remains; and in the whole of the town, which contained 16,000 souls, there are not ten houses inhabitable. . . . The number of wounded is exceedingly great. Women and young girls may be seen with two or three limbs fractured. The scene is a hundred times more horrible than a field of battle"

On the same day the Governor reports:—"Pointe-à-Pitre is entirely destroyed What was spared by the earthquake has since perished by fire, which burst out a few minutes after the houses fell. I am writing in the midst of the ruins of this unfortunate city, in presence of a population without food and without asylum, in the midst of the wounded, of whom the number is considerable—it is said, from 1,500 to 1,800. The dead are still under the ruins, and their number calculated at several thousands. The fire is still raging All the quarters of the colony have suffered. The town of Moule has been destroyed, and thirty persons are dead The small towns of St. François, St. Anne, Port Louis, Bertrand, and St. Rose, have been overturned; and in all there are dead and wounded I implore, in favour of the inhabitants of Guadaloupe, that inexhaustible goodness which from the throne pours forth so many benefits! I implore all France to stretch forth an aiding hand to us, as she has already done to Martinique. She will not abandon this population, entirely French, nor leave to wretchedness the widows and orphans whom this terrible disaster has overwhelmed I shall speedily send you such details as I shall be able to collect. I fear that the sugar-crop will be lost, for the mills are all destroyed. Famine stares us in the face; prompt succour is absolutely necessary Joinville has much suffered; Petit-Bourg is destroyed"

Some further particulars are added on the 14th:—"The best built, and consequently the richest quarter of the town, has suffered most; and it is said that the élite of the inhabitants have perished We are told, that at the moment of the earthquake upwards of 200 people were assembled at the Café Américain, to witness the drawing of a lottery for a small vessel, and none escaped. Some wretches took advantage of the dire confusion to plunder At first they were said to be negroes, led on by a man of colour but this, it has since appeared, was an error, and that the unfeeling robbers were all sailors, some say Americans, headed by their captain; all of whom have been arrested, and confined in the hold of some ship" This has been since ascertained to have been also erroneous, as the American sailors were in fact assisting the sufferers, but, as in the case of the English at the fire of Hamburg, in the fright and agitation of the moment their actions were misunderstood and their motives misrepresented Still the general fact, that robberies and plunder on the most extensive scale were committed, is undoubted, but unfortunately such practices are too general in all cases of general and paralysing calamity befalling large and populous towns, in which a class must always exist ready to commit any crime for the gratification of their passions the instant the hand of the law becomes relaxed.

Many were burned alive in the hospital. After all was over, the number of dead made the town pestilential, and the survivors fled. Basse Terre was also much injured. Several buildings fell, and others were so damaged as to be uninhabitable Subscriptions were raised with great promptitude for the relief of the sufferers both in Martinique and in France, and everything possible was done to relieve their destitution It does not appear that the volcano, La Souffrière, displayed any remarkable activity either before or during the fatal catastrophe.

STOCKINGS AND STOCKING-MAKERS.

There is something in hosiery texture remarkably different from that presented by the materials for most other garments. Instead of being a series of cross threads, woven at the loom, it is a series of *loops*, or *links*, so connected as to possess both strength and elasticity in a notable degree. It is not difficult to see why these qualities are of importance in a garment exposed to so much strain as a stocking.

Whether stockings are knit by hand or made by the machine, the texture is alike one of loops or links; but these were preceded in the order of time by hose made of pieces of cloth seamed together. Dr. Howell, in his 'History of the World,' says that Queen Elizabeth, in 1561, was presented with a pair of black knit silk stockings by her silk-woman, Mrs. Montague; and that thenceforth she never wore cloth ones any more. The same author adds that Henry VIII. ordinarily wore cloth hose, except when by chance there came a pair of silk stockings from Spain. His son, King Edward VI., was presented with a pair of long Spanish silk stockings by Sir Thomas Gresham, a present which attracted much attention and admiration at the time. From these various circumstances it has been inferred that the invention of knit stockings, of silk, if not of other materials, came from Spain. Anderson, in his 'History of Commerce,' states that one William Rider, an apprentice in one of the houses then existing on London Bridge, seeing at the house of an Italian merchant a pair of knit worsted stockings, from Mantua, took the hint, and made a pair exactly like them, which he presented to William, earl of Pembroke, and that they were the first of that kind worn in England, anno 1564.

Wherein the process of knitting consists may be known to those who have had opportunities of seeing humble cottagers at work in secluded districts, where the winter evenings are still to some extent devoted to this labour. It is a process in which needles, made of polished iron or brass wire, interweave the threads one among another, and form the meshes of which the stocking consists. This must not be confounded with the art of netting; for while netting, or the making of nets, consists of knotting the twine into meshes, knitting, or the making of stockings and similar articles, produces the meshes without any knots at all. Hence it may be readily comprehended why stockings could be so easily and speedily unknit, and why in nets this is impossible. A captured fish, in order to escape from a net, must tear to pieces, one after another, as many meshes as are equal to the circumference of its body; whereas if the net were formed in the same manner as a stocking, a single mesh, if torn, would suffer it to pass through. On the other hand, the formation of the stocking-loop gives a degree of elasticity not equalled by any other mode of production.

Different versions have been given of the origin of the "stocking-frame," the highly ingenious machine which has almost superseded knitting by hand. Savary states that it was a Frenchman who first invented the machine. Finding some difficulties in procuring exclusive privileges in his own country, which he required before settling in Paris as a manufacturer, he came over to England, where his machine was admired, and his reward was considerable. The invention thus imparted to the English was, it is said, guarded with so much jealousy, that for a long time persons were forbidden to carry any of the machines out of the island, or communicate a model of them to foreigners. But as it was a Frenchman who enriched our nation with it, so a Frenchman first carried it abroad again; for by an extraordinary effort of memory and imagination, he made a stocking-frame at Paris from the idea he had formed of one during a short residence in England.

Such is the account which was current among French writers in the last century. But later inquiry has rendered it nearly certain that England was the birthplace of the stocking-frame; and there is a singular air of romance about the history. Aaron Hill, in 1715, related the matter thus:—"It is not out of some men's remembrance that a young gentleman of no fortune, a student at Oxford, fell in love with an innkeeper's daughter of that town, whose circumstances were very narrow. He had philosophy enough to despise superfluous wealth, and judgment to see the necessity of a competence; but love was headstrong, and too hard for reason; so that, after a year or two's ineffectual delay, they bid defiance to the stars, and had courage enough to marry. The scholar gained a wife, and lost a fellowship, the only small subsistence he before depended on." The innkeeper began to think meanly of a man whose college-education did not seem to be worth a penny to him: the young couple lived with him till he died; they were then turned out of the house to seek a home elsewhere: the cares of a family came on; the wife earned a small pittance by knitting stockings; and the sequel runs thus:—"Sitting constantly together from morning till night, the scholar often fixed his eyes with steadfast observation on the motion of his wife's fingers in the dexterous management of her needles. He took it into his imagination that it was not impossible to contrive a little loom, which might do the work with much more expedition. This thought he communicated to his wife, and joining his head to her hand, the endeavour succeeded to their wish; and thus the ingenious stocking-loom, which is so common now, was first invented, by which he did not only make himself and his family happy, but has left his nation indebted to him for a benefit which enables us to export silk stockings in great quantities, and to a vast advantage, to those very countries from whence before we used to bring them at considerable loss in the balance of our traffic."

Beckmann, however, whose industry and acuteness have thrown much light on the history of inventions, has pretty clearly shown that Hill must have had some confused notions of the real truth, but had made a strange jumble of persons, places, and dates. The account now generally received is this:—About the end of the sixteenth century, or the beginning of the seventeenth, lived one William Lee, a native of Woodborough in Nottinghamshire, and a graduate of St. John's College, Cambridge. Being enamoured of a young country-girl, who during his visits paid more attention to her work, which was knitting, than to her lover and his proposals, he endeavoured to find out a machine which might facilitate and forward the operation of knitting, and by these means afford more leisure to the object of his affection to converse with him. Thus is the stocking-frame said to have been invented. It is more than probable that a romantic colouring has been given to the story; but that William Lee invented the machine seems now to be generally admitted. He instructed his brother in the use of it, and took apprentices and assistants, with whom he carried on business for some years at Calverton, a village near Nottingham. He is said to have shown his work to Queen Elizabeth, shortly before her death, and requested some support or remuneration; but he obtained neither, and was impeded rather than assisted in his undertaking. Under these circumstances, Lee accepted an invitation from Henry IV. of France, who had heard of this invention, and had promised to give a handsome reward to the inventor of it. Lee and nine journeymen went to Rouen, taking their machines with them; but the king being assassinated soon afterwards, and commotions arising, Lee fell into great distress, and shortly after died at Paris. Two only of his people remained in France. The other seven returned to England, and, joining their interests with one Aston of Thoroton, laid the foundation of the stocking-manufacture in England. The number of masters increased in the course of fifty years so much, that it was found desirable to unite themselves into one guild: and they were, in 1663, united into a company of stocking-weavers or frame-work knitters; the latter term being still re-

tained, because the principle of the machine is almost precisely that of knitting.

In a petition presented to Cromwell by the stocking-weavers, the following account is given of the early attempts to introduce the machine into Italy and Holland. In the year 1614 the Venetian ambassador, Antonio Correr, persuaded an apprentice, Henry Mead, by the promise of five hundred pounds sterling, to go with a loom to Venice for a stated time, and to teach there the use of it. Mead met with a favourable reception in that city; but the loom becoming deranged, and no person at Venice being able to repair it, when the time of his agreement expired he returned to England. The Venetians had not resolution enough to continue the attempt; and sent the damaged loom, together with some bad imitations of it, to London, where they were sold for a mere trifle. The other attempt is thus noticed:—Some years after this failure, one Abraham Jones, who understood both stocking-weaving and the construction of the loom, though not regularly taught, went with some assistants to Amsterdam, where he worked on his own account two or three years, till he and his people were carried off by a contagious disorder. The looms, as no one there could use them, were sent to London, and sold for a low price.

By the year 1669 the number of stocking-frames in England was nearly seven hundred, employing twelve hundred workmen, of whom three-fifths made silk stockings and the others worsted; for cotton was not then ranked among English manufactures. By the year 1714 the number of frames had increased to eight or nine thousand. Some years after this, the Framework Knitters Company attempted not only to control the manufacture of the fabric itself, but also the making and selling of the stockings, and endeavoured to form a joint-stock company for this purpose; but the project failed. By the year 1753, about twenty years after the introduction of cotton stockings, the number of frames in England was fourteen thousand, increased to twenty thousand in the next thirty years. In 1812 they were estimated at twenty-nine thousand, and in 1833 at thirty-three thousand.

The arrangement of the stocking manufacture is briefly thus:—Nearly all the worsted stockings are made in Leicester, Loughborough, and other places in Leicestershire; Leicester being the great centre towards which the product of all the machines in the county tends. Derby is, in like manner, the centre of the silk-stocking district; while Derby shares with Nottingham the supremacy among the cotton-stocking manufacturing arrangements. In every case the article made in the stocking-frame is not a stocking, but a piece of knit-work cloth, so to speak, which is afterwards sewn up into the form of a stocking by needle and thread. Hence there are three classes of operatives engaged; the 'winders,' who put the silk, cotton, or worsted thread into or on the machine; the 'stockingers,' or 'framework knitters,' who work the thread up into a knitted fabric; and the 'seamers,' who make the stockings out of the pieces thus produced. The winders are generally children, who can wind thread enough for half-a-dozen machines each. The knitters are men, women, and youths, who hire both the winders and the seamers; and the seamers are women.

Some of the stocking-frames are owned by the workmen who weave the stockings; some are lent out to the men by the owners, at so much per week for each frame; while other persons are the renters of what is termed a 'shop of frames,' containing eight or ten frames, let, with standing-room, &c., to the workmen. This peculiar kind of rental, and the relation which its amount bears to the workman's earnings, may be illustrated by an instance or two. When the Factory Commissioners were collecting information respecting the condition of the operatives in factories, in 1833, Mr. Felkin, of Nottingham, communicated to them some very valuable details concerning the stocking manufacture and its condition. He selected instances such as he thought would give a just idea of the average circumstances at that time; and of these, two or three may be here given.

"Edward Haywood, journeyman, fifty-three years of age, making 42-gauge No. 5 dumps (a technical designation for a particular sized stocking), works fifteen hours a day, produces eight pairs a week, at 1s. 4d. per pair . . . . 10s. 8d.

He pays necessary deductions as follows, viz.:—

Frame-rent 1s.; seaming 1s. 1½d.; needles 4d.; standing 3d.; coals 3d.; taking-in to bag-man 4d.; candles 6d. . . . 3 9½

Net earnings 6 10½"

This related to the cotton hosiery of Nottingham: but the same system applies to the worsted hosiery of Leicester, as exemplified in the following instance:—

"William Carter, of Leicester, gains by seventeen hours a day labour . . . . 9s 0d.

Subject to necessary deductions, viz., frame-rent 1s. 3d.; winding 4d.; candles 9d.; needles 3d.; master's charge 3d.; coals 3d.; seaming 10½d. 3 11½

Net earnings 5 0½"

We do not know whether the present average condition of the stocking-weavers is better or worse than that here indicated; and we only give these instances to illustrate the mode in which the manufacture is conducted, as between employers and employed. The 'taking-in' in the Nottingham case, and the 'master's charge' in the Leicester case, seem to be analogous, and arise thus:—The hosier or manufacturer lets out his frames, at about a shilling a week each, to the holders of a 'shop of frames;' and these latter charge that same sum, or perhaps three-pence more, to the journeymen or real workers, with the addition of three-pence for 'standing,' or shop-rent, and three-pence for the trouble of taking in the week's work to the manufacturer; because all the men working in one shop of frames work for one house; and the owner of the shop seems to act as a sort of agent between the real employers and the workmen.

Mr. Felkin, in 1832, estimated that the thirty-three thousand stocking frames consumed annually eight million pounds of cotton, worsted, and silk thread, valued at 800,000l., from which were made about forty million pairs of stockings. The wages of making were about a million sterling, and of finishing, a quarter of a million; making the total value of the stockings about two millions sterling. He also estimated that the number of stocking makers made up thirteen thousand men, ten thousand women, and ten thousand youths; besides twenty-seven thousand women and children employed in seaming, winding, &c.

Peasants of Catalonia.—These wear a high conical hat, with a broad brim, embroidered and tasselled; a coat of green velvet, with a richly embroidered collar and breast, a waistcoat of brocaded satin, a red or sometimes lilac silk scarf tied round the waist, brown striped velvet culottes, garters embroidered in gold, blue stockings, and sandals. Some have a large brown cloak hanging over one shoulder, which does not conceal their brilliant attire, and they hold it with such a graceful and regal air, that one cannot imagine those majestic and most independent-looking beings can be peasants.—*Lady Chatterton's Journey in Spain and France.*



[St Peter and St Paul restoring the Dead Youth to Life from the Chapel of the Carmine in Florence

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XI.

MASACCIO—(*concluded*).

THE portrait of Masaccio given in the wood-cut at p. 217 is from the head introduced into the fresco of the two Apostles before Nero—the finest of all and the chef-d'œuvre of the painter. The four remaining compartments were added many years later (about 1470) by the same Filippino Lippi, who seems to have been inspired by the greatness of his predecessors. It appears that the grand figure of St Paul standing before the Prison of St Peter (also shown in the wood-cut), which Raphael transferred with little alteration into his Cartoon of St Paul preaching at Athens, is now attributed to Filippino Lippi.*

But to return to Masaccio. In considering his works, their superiority over all that painting had till then achieved or attempted is such and so surprising that there seems a kind of break in the progression of the art—as if Masaccio had overleapt suddenly the limits which his predecessors had found impassable. But Ghiberti and his Gates explain the seeming wonder. The chief excellencies of Masaccio were those which he had attained or at least conceived, in his early studies in modelling. He had learned from Ghiberti not merely the knowledge of form, but the effects of light and shade in giving relief and roundness to his figures, which in comparison to those of his predecessors, seemed to start from the canvas. He was the first who successfully foreshortened the extremities. In most of the older pictures the figures appeared to stand on the points of their toes (as in the Angel of Orcagna at p. 136), the foreshortening of the foot, though often attempted with more or less success, seemed to present insurmountable difficulties. Masaccio added a precision in the drawing of the naked figure, and a softness and harmony in colouring the flesh, never attained before his time, nor since surpassed till the days of Raphael and Titian. He excelled also in the expression and imitation of natural actions and feelings. In the Fresco of St Peter baptizing the Converts there is a youth who has just thrown off his garment, and stands in the attitude of one shivering with sudden cold. "This figure," says Lanzi, "formed an epoch in art." Add the animation and variety of character in his heads—so that it was said of him that he painted souls as well as bodies—and his free flowing draperies, quite different from the longitudinal folds of the Giotto school, yet grand and simple, and we can form some idea of the combination of excellence with novelty of style which astonished his contemporaries. The Chapel of the Brancacci was for half a century what the Camere of Raphael in the Vatican have since become—a school for young artists. Vasari enumerates by name twenty painters who were accustomed to study there, among them, Leonardo da Vinci, Michael Angelo, Andrea del Sarto, Fra Bartolomeo, Perugino, Baccio Bandinelli, and the divine Raphael himself: nothing less than first-rate genius ever yet inspired genius, and the Chapel of the Brancacci has been rendered as sacred and memorable by its association with such spirits, as it is precious and wondrous as a monument of art.

> In this Chapel wrought
> One of the Few, Nature's interpreters,
> The Few, whom Genius gives as lights to shine—
> Masaccio, and he slumbers underneath.
> Would'st thou behold his monument? Look round,
> And know that where we stand, stood oft and long,
> Oft till the day was gone, Raphael himself,
> He and his haughty rival*—patiently,
> Humbly, to learn of those who came before,
> To steal a spark of their authentic fire,
> Theirs who first broke the universal gloom—
> Sons of the morning. —*Rogers.*

It is strange that so little should be known of Masaccio's history—that he should have passed through life so little noted, so little thought of, scarce any record remaining of him but his works, and those so few!—and yet so magnificent, that one of his heads alone would have been sufficient to immortalize him, and to justify the enthusiasm of his compeers in art. We are told that he died suddenly, so suddenly that there were suspicions of poison, and that he was buried within the precincts of the Chapel he had adorned, but without tomb or inscription. There is not a more vexed question in biography than the date of Masaccio's birth and death. According to Rosini, the most accurate of modern writers on art, he was born in 1417, and died in 1443, at the age of 26. Vasari also says expressly that he died before he was 27; in that case he could not have been, as the same writer represents him, the pupil of Masolino, who died in 1415. According to other authorities he was

* See Mr Eastlake's notes to Kugler's 'Handbuch.' "Some writers on art seem to have attributed all these frescoes indiscriminately to Masaccio; others have considered only the best portions to be his; the accuracy of German investigation has perhaps finally settled the distribution as above." (p. 108.)

* Michael Angelo.

born in 1401, and died at the age of 42. To the writer it appears that if he had lived to such a mature age something more would have been known of his life and habits, and he would have left more behind him. His death at the age of 26 renders clear and credible many facts and dates otherwise inexplicable; and as to his early attainment of the most wonderful skill in art, we may recollect several other examples of precocious excellence--Raphael himself, for instance, who was called to Rome to paint the Vatican in his 27th year. The head of Masaccio, painted by himself, in the Chapel of the Brancacci, at most two years before his death, represents him as a young man apparently about four or five and twenty.

ECONOMICAL USES OF THE LARCH.

The larch is one of that numerous list of trees whose timber contributes so extensively to the constructive arts. Any one who watches the progress of railways in the present day, and meets with advertisements for "larch-sleepers," will have cognizance of one of the valuable purposes to which this kind of wood is applied.

The larch was first planted in Scotland somewhat above a century ago. Different accounts have been given of the date when, and the person by whom, the introduction took place. It is, however, certain that the successive dukes of Athol have, for more than a century, planted larches to an astonishing extent in Scotland. Duke James of Athol, about 1730, planted about two thousand, at first for ornamental purposes, but afterwards with a view to the production of useful timber. He was succeeded, in 1764, by Duke John, who conceived the idea of covering the sides of the hills about Dunkeld with plantations of larches, avowedly with the object of introducing the larch as a valuable timber-tree. He had many difficulties to encounter, partly arising from the scarcity of young plants for his forest nursery, and partly from the existence of vast quantities of broom, furze, juniper, and heath on the ground to be occupied by the larches, and which impeded their after growth. He did not live many years to witness the result of his project; but nevertheless succeeded in planting eleven thousand larches. To him succeeded another Duke John, whose operations in this branch of arboriculture were most remarkable. From the year 1774 to 1826, a period of about fifty years, he planted *fourteen million* larch trees. At first, the Duke merely carried out the plans of his predecessor; but observing the rapid growth and hardy nature of the larch, he determined to plant it on the steep acclivities of mountains of greater altitude than any that had previously been tried. He enclosed a space of about thirty acres on the rocky summit of Craig-y-barns, and planted young larches among the crevices and hollows of the rock; while in other cases he substituted the larch where Scotch pines had previously been grown; for he found that, on a particular mountain-district, larches grew to a height of forty feet in ten years, whereas Scotch pines had attained a height of only six feet in forty years. Of the labours of this active nobleman in this enterprise, a writer in the Highland Society's 'Transactions' remarks:—"His Grace planted, in the last years of his life, six thousand five hundred Scotch acres of mountain ground solely with the larch, which, in the course of seventy-two years from the time of planting, will be a forest of timber, fit for the building of the largest class of ships in her Majesty's navy. Before it is cut down for this purpose, it will have been thinned out to about four hundred trees per acre. Each tree will contain, at the least, fifty cubic feet, or one load of timber; which, at the low price of one shilling per cubic foot (only one half of its present value), will give 1000*l*. per acre, or in all a sum of 6,500,000*l*. Besides this, there will have been a return of 7*l*. per acre from the thinnings, after deducting all expense of thinning, and the original outlay of planting. Further still, the *land* on which the larch is planted is not worth above from 9*d*. to 1*s*. per acre. After the thinnings of the first thirty years, the larch will make it worth at least 10*s*. an acre, by the improvement of the pasturage, upon which cattle can be kept summer and winter."

It is observable, from the above details, that the practical use of the larch is as yet comparatively in its infancy in this country; for the Athol plantations are rather nurseries for future times, than stores of larch timber at present available. The wood seems to be more and more valued as its qualities become known; and it will probably supersede others which have hitherto been held in greater repute. The writings of Dr. Anderson, about the year 1777, tended to draw public attention to the excellence of the larch as a timber-tree; and by the end of the same century the larch began to supersede the Scotch pine in many parts of Scotland. In Perthshire, Stirlingshire, Forfarshire, Banffshire, Morayshire, Inverness-shire, and Peebleshire, plantations of larches are to be found on a vast scale; it is, independent of its qualities as a timber-tree, the best improver of heath or moss pasturage yet known in Britain; and there is now scarcely any Scottish proprietor of a mountain district who does not cultivate it.

The wood of the larch varies from a yellowish-white to a reddish-brown, according to the situation where it is planted. When perfectly dry it is rather more than half the weight of an equal bulk of water.

In France and Switzerland the uses of the larch are very numerous. The tree is cultivated very little within the confines of France, but grows abundantly on the mountains by which it is belted on the south-east and south-west, and therefore furnishes a ready supply for the French and Swiss artisans. Rozier says that the Germans make their casks of larch, which may be almost said to last for ever, and from which the alcoholic portion of the wine is hardly ever found to evaporate. In Upper Dauphiny, Savoy, and the Pays de Vaud, houses are built of larch, by placing bulky squared trunks one upon another, in the manner of building Canadian log-houses: the heat of the sun, melting the resin contained in the wood, causes it to run down the sides, thereby filling up the interstices between the logs; and the edifice, thus rendered impervious to air and moisture, lasts for ages without deterioration. No wood remains uninjured in the water longer than the larch; and hence it is in general use, in France and Switzerland, for water-pipes. At Aix, Marseilles, and throughout the greater part of Provence, where the land is frequently irrigated, the pipes used to convey the water to the ground are always of larch.

M. Boissel de Monville, writing on the uses of the larch, gives many examples which illustrate the durability of the wood. In Switzerland it is used for vine-props, for which purpose it is found to be the most durable of all kinds of wood. The vine-props made of it are never taken up; they remain fixed for an indefinite succession of years, and see crop after crop of vines spring up, bear fruit, and perish at their feet, while the props themselves show no symptoms of decay. The same writer gives some remarkable details illustrative of the strength of the wood under the influence of lightning:—"I found frequent proofs of the excellence of the wood of the larch. The lightning often strikes and shatters these trees, the wind breaks them, and the effects of time cause them to perish by old age; all these modes of de

struction, and many others, caused me to find a great number of mutilated and dead trees in the forest. Those which were mutilated had not perished on that account. The branches which remained uninjured were still growing with vigour; the heart-wood was sound and unchanged; and the tree continued to live during a long series of years. The wood, even of those quite dead, showed no signs of decay, and had evidently remained in the same state a great number of years."

Turning our attention next to the use of larch-wood in Britain, we find that the first writer who described the wood from the experience which he had had of its durable qualities was Pontey; for Dr. Anderson's experience on the matter had been much more brief. Pontey groups the characteristics of the larch-wood, when compared with fir, under seven different headings, which, as they are explicit and important, we will here transcribe:—

1. It is much clearer of knots than the fir, provided a very small degree of attention be paid to it, during the first twenty years of its growth.

2. It is more durable; for though it produces dead knots when neglected, still it produces no rotten ones, or what carpenters call cork-knots. The fact is, that not only the heart and sap of the wood, but even the bark, are of so durable a nature, that we know no means of estimating when any one of them will decay, except under some species of mismanagement. There is a particular criterion by which larch is distinguishable from any other wood, which is, at the same time, a decisive proof of its durability; viz., the dead knots, or branches, and wood and bark, being always found fast *wedged*, as it were, in the timber; so that every knot of that description has a sort of ring round it nearly black. Any person who has larches growing, of some tolerable age, may convince himself of their durability by examining their dead branches, which, whether great or small, are never found rotten.

3. Larch is much less liable to shrink than common deal. It is well known that the latter is exceedingly liable to that defect, in the first instance; and the joiners tell us that, when a board, if it has been twenty years in use, is planed over again, it will again shrink: but not so with the larch; for if well dried at first, it never shrinks afterwards.

4. Larch will not crack with any moderate degree of heat, when in plank or boards, or when the poles are split as rails. When in bulk, or not sawn up, the case is the same, provided the bark remains on it; but if the bark be taken off while the wood is green, it cracks considerably.

5. Larch is much more tough than foreign deal. It splits with great difficulty, and never to any considerable length with the grain. Foreign deal, being so exceedingly apt to split, can seldom be used very thin; but the larch may be used in very thin slabs without fracture.

6. It has two properties which place it far in advance of deal, viz., its beautiful colour, and its capability of receiving as beautiful a polish as almost any variety of wood.

7. It may be used in situations where the best foreign deal proves of very short duration, viz., as posts for every description of fencing.

Every writer who has had occasion to treat of the larch as a timber-tree speaks in warm commendation of the excellence of the wood when exposed to wet. The Duke of Athol once caused an experiment of this kind to be made in the Thames. Posts of equal thickness and strength, some of larch and others of oak, were driven into the bed of the river at a spot where they were alternately covered with water by the flow of the tide, and left dry by its fall. This species of alternation is the most trying of all circumstances for the durability of timber; and accordingly the oaken posts decayed, and were twice renewed in the course of a very few years; whilst those which were made of larch remained altogether unchanged. Sir Thomas Dick Lauder, in his edition of Gilpin's 'Forest Scenery,' states:—"We had ourselves occasion to erect a foot-bridge to a pleasure-walk over a sunk road, and this we ordered to be constructed of two long stretching beams, covered transversely with larch planks. In fourteen or fifteen years afterwards, we discovered symptoms of decay in the bridge, and ordered the carpenter to new plank it; but, when he came to carry our directions into execution, he discovered that the whole of the planks were quite sound, with the exception of three; and that these three, which were rotten almost to powder, were Scotch fir planks, which had been used in a hurry at the time the bridge was built, to supply a deficiency in the original number of larch planks."

As naval timber the larch is rising rapidly into note. Mr. Mathew, in his 'Treatise on Naval Timber,' after remarking that vessels built of larch had been found to answer admirably, and that several thousand tons of shipping are now annually constructed of it, says:—"The first instance we have heard of British larch being used in this manner, was in a sloop repaired with it about 1808. The person to whom it had belonged, and who had sailed in it himself, stated to us, immediately after its loss, that this sloop had been built of oak about thirty-six years before; that at eighteen years old her upper timbers were so much decayed as to require renewal, which was done with larch; that eighteen years after this repair, the sloop went to pieces on the remains of the pier of Methel, Fifeshire, and the top timbers and second foot-hooks of larch were washed ashore as tough and sound as when first put into the vessel, not one spot of decay appearing. The owner of a larch brig, who had employed her for several years in tropical voyages, also assures us that the timber will wear well in any climate, and adds that he would prefer larch to any other kind of wood, especially for small vessels.

As sleepers for railways, axles in mill-work, hop-poles, and stakes for plants in agricultural matters, and all purposes where damp earth or air is likely to affect the wood, larch is of admirable service. As a building material for common house-work, it is used only for the larger pieces, being too difficult of working for general use. Where sawyers are employed to rip the beams into planks, they are paid higher per foot than for pine or deal, on account of the hardness of the larch.

The other properties of the larch-tree we must dismiss in a few words. The bark is much used in France and Switzerland for tanning, but is not very extensively applied to that purpose in Britain. The leaves of the tree are eaten in Switzerland by cattle and sheep, but less eagerly than those of the evergreen pines and firs; because the former, being deciduous, are only to be found in a green and eatable state when the more palatable food of grass is abundant. The charcoal of the larch is very heavy, and is said to be excellent for iron-founderies. During the months of May, June, and July a substance is sometimes collected from young larch-trees, called *manna of Briançon*: it forms on the young shoots, or on the buds and leaves, in the form of little white glutinous grains; but it soon melts if not speedily collected, and only appears on the trees of some particular districts. Of the "Venice turpentine," which is yielded by the larch, we had occasion to speak in an article in one of our February numbers.



[Penshurst Church.]

RAILROAD RAMBLES

PENSHURST

SPRING once more in the fields and the woodlands, and we not there to welcome him! Soft and fresh airs, tender green leaves, sweet-smelling and gaily-hued flowers meeting us in all but the densest of metropolitan localities, and we still lingering at home unmindful of the pomp that is abroad! Come, let us at least procrastinate no longer: we know not what we lose by the delay.

It is one of the fairest of spring mornings: the sun is shining brightly, but not powerfully, the light breeze that springs up at intervals, fanning the hair on our cheek, or stirring the tree tops with strange murmurings, has lost its wintery chill, white clouds extend in perfect repose over the sky, revealing here and there between the blue depths beyond; it is in short one of those days, not numerous enough in our climate for us to be spendthrift of them when they do come, which Nature herself seems to dedicate to the wanderer's enjoyment. And as rapidly careering along, we leave streets, houses, and lanes behind, and the broad meadows begin to appear, extending far and wide, radiant with golden flowers, or green with the young crop that gladden the farmer's eye more than all the gold cups in the world, how exhilarating is the feeling with which we greet every well-known feature of the season, how delicious the self-congratulation that whispers—Ay, we are here again; once more in the country.

We are on another new railway, the Dover. The business of intersecting England with iron roads goes steadily on, and will no doubt continue to do so till some new invention again revolutionises that system. Was it not said in the earlier period of the railroads that they were agents of a very unpicturesque character, and matter-of-fact tendencies? Railroads unpicturesque! Is it possible he who held such a notion ever travelled five miles upon one of them—had passed now over one busy road, then under another, along elevated embankments, with precipitous descents on each side that almost make one's head giddy to look down—thence into abysses, which certainly make one's head and neck ache to look up so as to catch a glimpse of the sky—now through the deep and eternal midnight of the mile-long tunnel, where the friend in the opposite seat is as invisible to the eye, as his voice, in spite of his utmost efforts, is inaudible to your ear, and from which when you emerge into the light of day, you are almost blinded with the intolerable radiance? Then the engine, and its train of followers, sweeping along like some destiny and its victims, with one steadily tremendous pace, hesitating at no obstacle, hill or valley, river or morass, condescending neither to swerve to the right or the left, to ascend or to descend, but plunging, whirling, tearing, crushing on to the appointed place—is there nothing picturesque here, nothing suggestive to the imagination? Again, as to the tendencies of the railroad, there are no more attractive and peculiar features attached to them than the facilities they offer to the lover of the picturesque. Not singly by the economy of time, but in the new tracts of country they have revealed to him, each possessing its own hitherto unvisited and therefore unenjoyed beauties of landscape, its own special objects of interest. But the train stops: on the right a board inscribed "To Penshurst" appears, and we desire no better illustration of the tendencies of the system that has opened to us, for the first time, such spots as the birth-place of the author of the 'Arcadia.'

The road that first receives us appears somewhat unpromising, being new, broad, and formal, but it presently falls into a lane, such as is not often our lot to meet with even in the country. The profusion of violets and primroses that adorn the hedges is something like that suggested by the writings of the old poets: nor are these the only flowers; the lovely orchis, with its



[Orchis mascula.]

spotted leaves and pink flowers, beautiful as the garden hyacinth, attracts the eye, and reminds us that we must be indeed in the country, to find such a treasure of the fields ungathered. But the orchis grows plentifully here in the meadows, and is familiar in all its dyes to the solitary peasant, who alone passes this way, and who might otherwise be tempted to pluck it. As we advance, the wild beauty of the lane increases. The paling of the solitary farm-house is thickly encrusted with lichens: the road, now beginning to ascend, runs through a kind of plantation, where masses of rock appear scattered about, and the path is literally a primrose one. On our right now lies Redleaf Park, where, we understand, is to be found a remarkably fine collection of the works of recent or living artists, and to the owner of which we are indebted for the strikingly beautiful and genuine-looking specimen of Swiss architecture here shown. This forms a labourer's cot-



[Cottage near Penshurst.]

tage, and is in every way suitable for its objects, it is therefore no toy, but a real substantial thing, with massive beams, framed, like its foreign prototypes, to resist the strongest winds that blow, with a porch open on all sides, as large as many an apartment in our town-built cottages. The perfect taste visible through the whole must impress every one at a glance, a result mainly derivable from the character before alluded to—the air of genuineness that pervades alike the building and the materials of which it is constructed: it would do a London builder good to see the size of the stone masses which form the path, or to see what expression may be developed even in a cottager's chimney. This building is of two stories: another, farther along the road, possesses but one; this also is remarkably picturesque.

We are fortunate to-day: that bird, whose remarkable plumage and mode of flight attracted the eye as it just darted across the road into yonder chestnut-tree with its up-turning pyramidal spikes of white flowers, and which now sets up a still more remarkable cry, or laugh, as one could almost fancy it, is the spotted woodpecker; and, hark! there is the cuckoo, with its low, deep, distant-sounding, double note, faithful as ever to the season and the flowers it loves, the

> ——"daisies pied, and violets blue,
> And lady-smocks all silver white."

A little farther on, and the park of Penshurst opens on our left in a fine amphitheatrical form, with a richly wooded, picturesque piece of water in the bottom: that park which is so full of poetical associations! What says Ben Jonson, a delighted visitor here?—

> "Thou art not, Penshurst, built to envious show
> Of touch, or marble; nor canst boast a row
> Of polished pillars, or a roof of gold:
> Thou hast no lanthorn whereof tales are told,
> Or stair, or courts; but stand'st an ancient pile,
> And these grudged at, art reverenced the while.
> Thou joy'st in better marks of soil, of air,
> Of wood, of water, therein thou art fair.
> Thou hast thy walks for health as well as sport,
> Thy Mount to which the Dryads do resort,
> Where Pan and Bacchus their high feasts have made
> Beneath the broad beech and the chestnut shade;
> That taller tree, which of a nut was set
> At his great birth, where all the Muses met.
> There, in the writhed bark are cut the names
> Of many a sylvan taken with his flames.
> And thence the ruddy Satyrs oft provoke
> The lighter Fauns to reach thy Ladies Oak."

The "taller tree" still exists, planted at the birth of Sidney, though the Ladies' Oak is gone—cut down, it is



[Sidney's Tree.]

supposed, in 1768; whilst the "broad beech," magnificent still in their partial decay, have assumed a new interest from their connection with Waller and Saccharissa; the latter the Lady Dorothy Sidney, eldest daughter of the Earl of Leicester, whom the poet has immortalized in his writings under that name. Saccharissa's walk is presumed to have been the favourite place where the poet fed his passion by sweet but dangerous converse with one of the most beautiful and accomplished women of her time. The result is well known: she rejected Waller's addresses, it is said with disdain; and the poet determined to go abroad, as he himself tells us in a poem written at Penshurst: hence in part no doubt the voyage to Bermuda. Lady Sidney married Lord Spenser, afterwards Earl of Sunderland, who was killed at the battle of Newbury, 1643, fighting as a volunteer for the king. As to Waller, he not only survived the lady's obduracy, but was able to write in the following strain of humorous imprecation upon receiving the news of the wedding. His correspondent is Saccharissa's sister, Lady Lucy Sidney:—"May she that always affected silence and retiredness have the house filled with the noise and number of her children, and hereafter of her grandchildren; and then may she arrive at the great curse so much declined by fair ladies, old age. May she live to be very old, and yet

seem young; be told so by her glass, and have no aches to inform her of the truth; and when she shall appear to be mortal, may her lord not mourn for her, but go hand-in-hand with her to that place where we are told there is neither marrying nor giving in marriage; that being there divorced, we all may have an equal interest in her again. My revenge being immortal, I wish all this may befal their posterity to the world's end, and afterwards." Most beneficent of curses, certainly, but evidencing, we fear, no very alarming amount of anguish at the writer's own disappointments. The same considerations that first served as a tender and delicate, but indirect, mode of endeavouring to move her to listen to his suit, consoled him no doubt under its failure.

> "Yet what he sung in his immortal strain,
> Though unsuccessful, was not sung in vain:
> All but the nymph, that should redress his wrong,
> Attend his passion and approve his song."

And so he lived on, like a wise man, to a good old age, and to jest on the subject in his latter days with Sacharissa herself. On meeting one day at the Countess of Wharton's, at Woburn, near Beaconsfield, where a numerous company was assembled, she asked him "when he would write such fine verses on her again." The question almost deserved the not very gallant answer it received: "Oh, Madam, when your ladyship is as young again."

The pleasantest way to the mansion, now beginning to be visible, is through the village and churchyard, both interesting: a lofty pine spreads its dark branches over the road at the very commencement of the former, which it seems to mark as the commencement in a peculiarly picturesque manner; whilst the entrance into the churchyard is still more noticeable. Opposite an old tree, with

> "seats beneath the shade,
> For talking age and whispering lovers made,"

is a square opening between and under some antique houses: that is the way into the churchyard. We may here pause a moment to observe that Penshurst presents another instance of the decline of the once popular customs of England. The villagers were accustomed to meet on a neighbouring bridge over the Medway, at a certain period of the year, and dance till midnight by the light of torches and of the illuminated houses near. The limits of innocent enjoyment were, as might be anticipated, not always very strictly observed; so the gentry, instead of endeavouring to correct that evil, adopted, it seems, the shorter course of discountenancing the festival altogether: and so this custom, in which time, place, and the nature of the enjoyment must have united to form a scene unrivalled for its peculiarly picturesque effect, has vanished from Penshurst. The churchyard, divided from the mansion by a fine row of trees, contains some tombs decorated in a very pleasing manner with evergreens and flowers, and which exhibit none of that affectation of sentiment that pervades so many of the memorials in our modern cemeteries, but a great deal of the reality: the hands of affection seem to have been here recently, though many years have elapsed since the graves received their inhabitants. The church is a very fine old building, and has at no distant period undergone extensive repairs, of which some have been executed in a spirit of true apprehension of the beauty of its old Gothic architecture. The chancel belongs to the Sidney family, several of whose monuments it contains. Let us now step on toward the "castle," as it is here popularly called.

[To be continued.]

THE LOCUST-SWARMS OF ASIA.

The locust is one of those little insects which at times inflict upon man an amount of inconvenience and mischief wholly inconsistent with its dimensions, and due principally to the power of numbers. A swarm of locusts is one of the most fearful visitations to which the East is exposed, and is altogether extraordinary. In one of our early volumes we gave an account of the locust in its habitudes as an animal; but it may be interesting to present here a brief abstract of the accounts which two or three writers of note have given of the effects produced by swarms of locusts in cultivated ground.

M. Kohl, in his account of the provinces lying between the Black and Caspian seas, states that locusts are there met with occasionally: several years sometimes passing over without any being seen, and then swarms appearing four or five years in succession. From the year 1820 to 1834, a complete cycle of changes seems to have occurred. The locusts began to be frequently observed in the former year; became very troublesome by 1824 and 1825; and arrived at a pitch of annoyance in 1828 and 1829, such as had never before been known; by the years 1831 and 1832 their numbers had materially diminished; and by 1834 they disappeared altogether.

The farmers and agriculturists of those districts have established a kind of *locust-police*: Whoever first sees a swarm approaching is bound to raise an immediate alarm, and to give the earliest possible information to the chief personage of the village. Orders are then given, and every man, woman, and child comes forth, armed with bells, tin kettles, guns, pistols, drums, whips, and whatever other noisy instruments they can lay their hands on. A frightful din is then raised, which often is the effect of scaring away the swarm. It is said that when the Empress of Russia visited Odessa in 1828, she had an opportunity of seeing a swarm of locusts scared away from a garden by a party armed only with drums. The locusts have a dread of smoke as well as of noise; and the peasants sometimes take advantage of this circumstance to smoke them away: they get together, on the first appearance of a fresh swarm, as much straw, vine-branches, and dry dung as they can, and light fires with these about the fields and grounds which it is thought most desirable to protect. This expedient, however, is often a complete failure; for when one of these countless swarms has dropped upon the ground and proceeds grazing along in the direction of the fire, the mere weight of the general mass forces the foremost ranks into the flames, where a few thousands of them perish perhaps, but their bodies extinguish the fire, and leave a free field for the advancing enemy.

Whenever, in the line of their flight, the locusts meet with a village, they always settle down upon it, and devour all that comes in their way. The roofs of the houses, the floor, and every inch of ground are soon covered with the hissing, buzzing, and crawling vermin. During the locust years at Odessa, the swarms covered the streets and public places, dropping by hundreds into the kettles and saucepans in the kitchens, and invading alike the ball-room, the granary, the boudoir, and the hovel.

The young locusts crawl until their wings are developed, and in their march they will overcome most obstacles. They climb over the roofs of the low houses, over fences and walls, march through the streets of towns and villages, not avoiding either man or beast, so that the wheels of a cart will at times sink several inches deep into a mass of locusts, while a pedestrian walking through them will often have them up above his ancle. A swarm of young locusts unable to fly is

more dreaded than one of older insects, for it is in vain to think of driving them away by noise or smoke; whichever way they escape, they must still go along the ground; and if a few hundred thousands of them be killed, this avails but little against the millions which form a swarm.

The flying swarms of full-grown locusts appear in the steppes chiefly about the month of August. Their flight is clumsy, and always accompanied by a rustling noise, which, when a swarm of them flies along, is as loud as that made by a strong wind blowing through a grove of trees. On a fine day they sometimes fly along at a height of two hundred feet from the ground, while at other times they approach very near the surface. The swarm of locusts is so dense, that is, the height or depth of the heap is such, that every ray of sunshine or daylight is excluded from between them, and the ground beneath is thrown into complete shadow.

When the insects espy a green field, they descend precipitately, and in their eagerness they often break their wings in the descent. The peasants of southern Russia assert that when a large cloud of locusts falls, it will cover a piece of ground four versts long by one verst broad (i.e. three miles long by three-quarters broad), and in many places the creatures will lie three or four deep. Now allowing for each insect a surface two inches by one, and making no account of the patches where they lie three or four deep, it would follow that a small swarm, covering only one square verst, must consist of nearly a thousand million locusts!

These swarms are such as are met with in the steppes or plains of southern Russia. But Captain Basil Hall gives a narrative of a locust-plague much more fearful and destructive. His details relate in the first instance to Asia Minor, westward of the steppes, and in the second instance to Guzerat eastward of the same district. In his second series of 'Fragments of Voyages and Travels,' Captain Hall states:—"Captain Beaufort, with whose interesting and delightful book on Caramania every reader of travels is familiar, told me that when he lay at Smyrna, in 1811, he had an opportunity of forming a rude estimate of the magnitude of a flight of locusts which was drifting past from south to north. The consul had occasion to send a messenger, in a due easterly direction, to the bashaw of Sardis, in Asia Minor, that is, in a course at right angles to the flight of locusts. This person rode forty miles before he got clear of the moving column of these ravenous animals. It was inferred, from observations made with a pocket-telescope, that the height of the column could not be less than three hundred yards, and the rate at which it passed not slower than seven miles an hour. This continued for three days and nights, apparently without intermission. As these insects succeeded one another at an average distance of not more than three feet, and were about one foot apart above one another, it was computed that the lowest number of locusts in this enormous swarm must have exceeded 168,608,563,200,200." After remarking that the mind is incapable of appreciating such numbers unless compared with some standard, Captain Hall proceeds:—"Captain Beaufort determined that the locusts he saw, if formed into a heap, would have exceeded in magnitude more than a thousand and thirty times the largest pyramid of Egypt; or if they had been placed on the ground close together, in a band of a mile and an eighth in width, it would have encircled the globe!"

This is supposed to have been a portion of a swarm which wrought dreadful mischief in western India in 1811, and of which Captain Hall gives a brief account. Myriads of locusts appeared in Bengal about the beginning of 1810, from whence they took a north-westerly course across upper India. It chanced that the fall of rain in the following year proved very scanty, so that the locusts easily devoured what crop of grass there was. As soon as this was accomplished, they proceeded in a body to the north-west district of Guzerat, and the neighbouring provinces. The swarm never reached so far south as Bombay, and entirely disappeared in 1812.

The destruction in Guzerat effected by the locusts is said to have been almost universal. In the latter part of 1811, the whole of the western part of the province appeared to the eye to be covered with rich cultivation; but when the crops were examined, the grain was found to be gone and merely the stalks left. The district of Marwar, where there had been a scarcity of rain was first attacked, and the wretched Marwarees, deprived of the means of life, rushed in a living torrent into Guzerat; so that the subsequent calamity at the latter place fell upon a greatly augmented number of sufferers: the demands upon the resources of the country were doubled, while the means of supply were reduced to one-tenth part of their average; and in many places there was literally no crop at all left after the ravages of the locusts.

Captain Carnac in an account of this locust-plague which he published in the 'Bombay Literary Transactions,' says, "The enhanced price of grain, added to the apprehensions of the inhabitants, which impelled them to store their individual resources in times of such danger, and the villainies practised by the higher classes to derive pecuniary advantage from the pressing wants of the people, soon reduced the half-famished emigrants to the greatest privations. The endurance of hunger was supported, however, by the Marwaree people with unaccountable pertinacity, which in some degree blunted the natural feelings of sympathy in their lot. Whether the ready assistance rendered to these people, on their first entrance into Guzerat, had induced them to imagine that under no circumstances would the hand of charity be withdrawn, or whether it was from the innate indolence of their character, or the infatuation which often accompanies the extremes of misfortune, that they rejected the certain means of subsistence by labour,—it is notorious that, when the benevolent tendered employment to these people, it was uniformly declined, even with the certainty of death being the consequence of the refusal."

Eye-witnesses of the occurrences in Guzerat state that multitudes of the Marwar people, whom hunger had driven into Guzerat, were seen crowded like cattle in droves, beyond the suburbs of all the great towns, or by the road-sides, the dead and the dying together, men, women, and children, packed as it were in one mass; those who were yet alive suffering from acute diseases brought on by hunger and want. The hourly recurrence of accumulated miseries familiarized the minds of these poor people, as well as the natives in general, to every extremity of suffering that human nature could bear. In a short time, those emanations of individual feeling among themselves, which distinguished the first commencement of their sufferings, gradually abated, and the utmost indifference began to predominate. The wealthy inhabitants of Guzerat and of Bombay subscribed very largely for the relief of the starving sufferers, and opened places where they could come to receive a share of victuals. "It was a cruel sight," says Captain Carnac, "to those possessed of sensibility, to witness the struggles when the doors were opened to apportion the victuals. Every sentiment of humanity appeared to have been absorbed by the crowds collected around; and it was no unusual thing to be informed that such and such a number had fallen a sacrifice to their precipitate voracity: many, also, whose wants had been supplied, continued to de

vour until the means intended for their relief proved, in the end, their destruction in a few hours. Children were often crushed to death, when attending for their pittance of food, under the feet of their own parents."

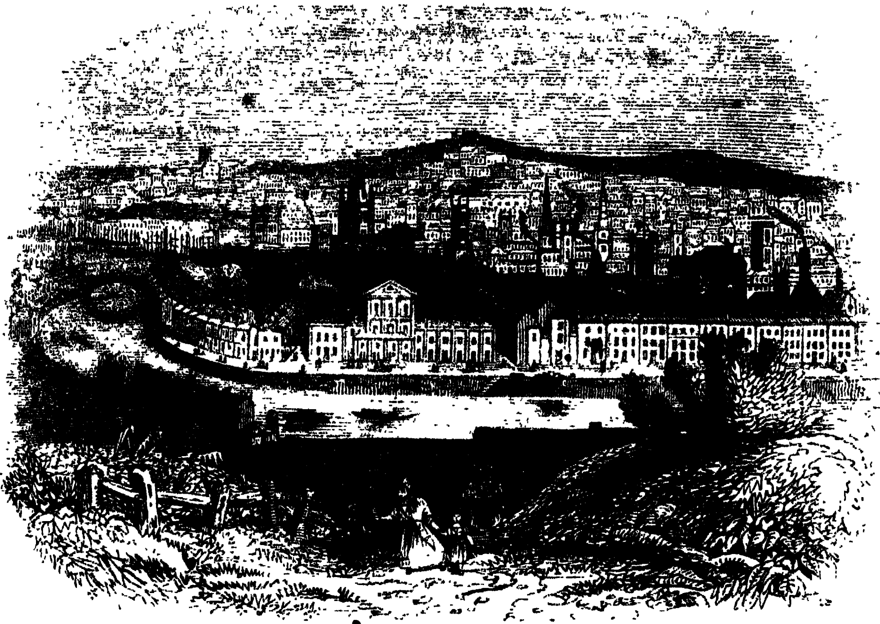
As the dead bodies dropped around, it became a most serious question what to do with them. At and near the town of Baroda, the poor Marwarees died at the rate of five hundred a day; but at Ahmedabad, a large city with two hundred thousand inhabitants, one hundred thousand died from this awful visitation. "The demand for wood to burn the dead called for the destruction of the houses; even this was barely sufficient for the performance of the rites required by the Hindoo faith; and the half-consumed bodies on the banks of the Saburmuttee evince at this hour (February, 1815, or two years and a half afterwards) to what straits the Hindoos were reduced in fulfilling the last duties to their kindred."

Many of the details given by Captain Carnac, of scenes which came under his own notice, are too distressing for us willingly to transcribe. Suffice it to say that he estimates, out of every hundred Marwarees who fled for succour to Guzerat, that ninety-nine died that same year. And all this mischief to be produced by insects only an inch or two in length! It is, as we before observed, simply an effect of *numbers*, and as such must always be considered. A writer on this subject has observed, in respect to the attacks of the locusts, that they eat up every green thing that comes in their way. "The leaves and young branches vanish from the trees in a trice, a rich meadow is presently converted into a track of black earth, the bank of a river is stripped with magical rapidity of its reedy fringe, and not a particle of stubble is left to mark the place where the green corn was waving but an hour before. As they eat they keep moving on, but as the first comers seldom leave much for their successors, the rear-guard frequently rise into the air, and let themselves down again somewhat in advance of the main body. Others are continually flying away towards the flanks, and in proportion as the marauders advance, their solid phalanx assumes more and more the appearance of a lengthened line. The sound of the little animals bite as it grazes, joined to the continual rustling of its wings, which it always keeps in motion while feeding, may be distinctly heard at a considerable distance."

European Wolves.—Wolves howl more frequently when the weather is about to change to wet. They grovel with the nose in the earth, instead of digging with their paws, when they wish to conceal a part of their food or the droppings about their lairs. The parent wolves punish their whelps, if they emit a scream of pain: they bite, maltreat, and drag them by the tail, till they have learned to bear pain in silence. Wolf-hunters commonly assert that the animal is weak in the loins, and, when first put to speed, that his hind-quarters seem to waver, but, when warmed, that he will run, without halting, from the district where he has been hunted, taking a direct line for some favourite cover, perhaps forty miles or more in distance. On these occasions he will leap upon walls above eight feet high, cross rivers obliquely with the current, even if it be the Rhine, and never offer battle unless he be fairly turned, then he will endeavour to cripple the opponent by hasty snaps at the fore-legs, and resume his route. The track of a wolf is readily distinguished from that of a dog by the two middle claws being close together, while in the dog they are separated: the marks, however, when the wolf is at speed, and the middle toes are separated, can be determined by the claws being deeper and the impression more hairy, the print is also longer and narrower, and the ball of the foot more prominent. Inferior in wily resources to the fox, the wolf is, nevertheless, endowed with great sagacity. His powers of scent are very delicate, his hearing acute, and his habits always cautious. The European variety is naturally a beast of the woods, those of the arctic regions and of the steppes of Russia and Tartary have different manners, probably from necessity, not choice.—*Colonel H. Smith's Habits of Dogs.*

Wood-paving at Toronto.—The side-walks are chiefly, though not entirely, of wooden plank, placed longitudinally, as on a ship's deck, and forming a far more clean, dry, elastic, and comfortable material for walking on, than any pavement of stone or brick. In the few instances, indeed, in which flat stone pavement is used instead of wood, it is extremely disagreeable to pass from the latter to the former, the difference being quite as great as that experienced in passing from the rough stone pavement of the centre of Broadway, at New York, to the smooth and noiseless wooden pavement opposite the City Hall and Park, where this transition takes place. Not only are these wooden side-walks in general use here, but, in one instance, planks of fir have been used for making an extensive road into the country leading eastward from Toronto to Kingston. We drove about six miles out on this road beyond the river Don; and I never remember to have travelled so smoothly. The planks composing the road are about fifteen feet in length, a foot in breadth, and an inch in thickness, they are sawn smoothly, but are not planed. The road is first levelled, and on the bed thus formed these planks are laid across transversely and not lengthwise as in the side-walks. A small portion of soil and dust is strewed over the whole to prevent unnecessary friction on the wooden surface, so that unless the attention of the traveller was called to the fact he would not perceive the planks over which he was driving, though he would recognise the unusual smoothness of the road by the motion. But while to the casual observer it presents the same earthy and dusty appearance as any other road, there are no ruts or pits in it—scarcely, indeed, a mark of the horses feet or carriage-wheels that pass over it. On close examination, however, he will see the separate planks, and trace their line of junction, and he will also hear the peculiar, dull, smooth sound given out by the low rumbling of his vehicle over the wooden platform.—*Canada, Nova Scotia, &c., by J. S. Buckingham.*

The Cataract of the Velino.—From Spoleto we went to Terni, and saw the cataract of the Velino. The glaciers of Montanvert and the source of the Arveiron is the grandest spectacle I ever saw. This is the second. Imagine a river sixty feet in breadth with a vast volume of waters, the outlet of a great lake among the higher mountains, falling three hundred feet into a sightless gulf of snow white vapour, which bursts up for ever and ever from a circle of black crags and thence leaping downwards make five or six other cataracts each fifty or a hundred feet high which exhibit on a smaller scale and with beautiful and sublime variety, the same appearances. But words (and far less could painting) will not express it. Stand upon the brink of the platform or cliff, which is directly opposite. You see the ever-moving water stream down. It comes in thick and tawny folds, falling off like solid snow gliding down a mountain. It does not seem hollow within, but without it is unequal, like the folding of linen thrown carelessly down. Your eye follows it, and it is lost below, not in the black rocks which gird it around, but in its own foam and spray, in the cloud-like vapours boiling up from below, which is not like rain, nor mist, nor spray, nor foam, but water, in a shape wholly unlike anything I ever saw before. It is as white as snow, but thick and impenetrable to the eye. The very imagination is bewildered in it. A thunder comes up from the abyss wonderful to hear, for, though it ever sounds, it is never the same, but, modulated by the changing motion, rises and falls intermittingly. We passed half an hour in one spot looking at it, and thought but a few minutes had gone by. The surrounding scenery is, in its kind, the loveliest and most sublime that can be conceived. In our first walk we passed through some olive groves, of large and ancient trees, whose hoary and twisted trunks leaned in all directions. We then crossed a path of orange trees by the river side, laden with their golden fruit, and came to a forest of ilex of a large size, whose evergreen and acorn-bearing boughs were intertwined over our winding path. Around, hemming in the narrow vale, were pinnacles of lofty mountains of pyramidical rock, clothed with all evergreen plants and trees, the vast pine whose feathery foliage trembled in the blue air—the ilex, that ancestral inhabitant of these mountains—the arbutus, with its crimson-coloured fruit and glittering leaves. After an hour's walk, we came beneath the cataract of Terni, within the distance of half a mile, nearer you cannot approach, for the Nar, which has here its confluence with the Velino, bars the passage. We then crossed the river formed by this confluence, over a narrow natural bridge of rock, and saw the cataract from the platform I first mentioned. We think of spending some time next year near this waterfall.—*Shelley's Posthumous Prose Works.*



[Bristol in the 17th Century.]

PROGRESSES OF QUEEN ELIZABETH.

No. VII.

1574—Bristol.

In this year the Queen commenced her Progresses early, for on the 2nd of March she visited the Archbishop of Canterbury at Lambeth, and on the 12th of the same month she was at Gorhambury. In May preparations were made for a second visit to the Archbishop at Croydon, and S. Bowyes, her Usher of the Black Rod, was sent to prepare lodgings for her Majesty and attendants. In a report made by him we have a curious exemplification of the inconveniences that must have been common when a court was to be accommodated in a private residence. The paper is headed "Lodgings at Croydon, the Bishop of Canterbury's house, bestowed as followeth, the 19th of May, 1574." The list does not explain much of the arrangement of the house, as the entries are chiefly such as "the Lord Chamberlain at his old lodgings;" "the Lord Treasurer where he was:" but we have "the Lady Marquis," and the "Lord Admiral," both placed at the "nether end of the great chamber;" but after fixing "where they were," the maids of honour, the grooms of the privy chamber, the gentlemen ushers, &c. &c., he goes on to state that, "for the Queen's waiters, I cannot as yet find any convenient rooms to place them in, but I will do the best that I can to place them elsewhere, if it please you, Sir, that I do remove them. The grooms of the Privy Chamber, nor Mr. Drewrye, have no other way to their chambers but to pass through that way again that my Lady of Oxford should come. I cannot then tell where to place Mr. Hatton, and for my Lady Carewe here is no place with a chimney for her, but that must lie abroad by Mrs. Aparry, and the rest of the privy chambers. For Mrs. Shelton here is no rooms with chimneys; I shall stay one chamber without [out of the house] for her. Here is as much as I have any ways able to do in this house." This is in the Archbishop's palace; what must have been the discomforts to all the suite in the houses of country squires who were sometimes visited, and what trouble and expense must have been inflicted! Though these visits were no doubt flattering distinctions, they were dearly purchased. This visit to Croydon, however, was not paid; as the court went to Havering instead for some days.

In July the Queen commenced her progress to Bristol. On her way she visited Sir Edward Umpton at Wadley, near Farringdon, Berks; then passed a few days at her own palace of Woodstock; proceeded to Lady Chandos at Sudeley Castle; rested one night at Mr. Huntley's at Frocester in Gloucestershire; and the next day, the 11th of August, again visited Lord Berkeley at Berkeley Castle. Here occurred one of those characteristic speeches of Elizabeth's which mark alike her thorough insight into human character and her occasional disregard of the conventionalities of court language. Lady Berkeley was the sister of the Duke of Norfolk, beheaded in 1572 for his conspiracy in favour of Mary Queen of Scots; on this visit she delivered a petition on her knees to the Queen in relation to some law-suit then pending; Elizabeth's answer was, "No, no, my Lady Berkeley, we know you will never love us for [on account of] the death of your brother."

On the 14th of August she entered Bristol, received by the mayor and corporation with great pomp and magnificence, the incorporated companies attending with their banners, and the mayor bareheaded carrying the sword before her. During her stay she resided at the mayor's house on St. Augustine's Back, and she knighted him on her departure. The pageant got up for the occasion was the production of Thomas Churchyard, a poet of some celebrity in his day, and who published "The whole order how our Sovereign Lady Queen Elizabeth was received into the city of Bristow." At the High Cross, in a disguised form, stood Fame, "very orderly set forth, and spoke as followeth, by an excellent boy:—

"Nor fleet of foot, nor swift of wing, nor scarce the thought in breast,
Nor yet the arrow out of bow, nor wind that seld' doth rest,
Compares with me, quick world's report, that some calls flying fame,
A burst of praise, a blast of pomp, or blazes of good name.

The only land that kings do seek, a joy to catch estate;
A welcome friend that all men love, and none alive doth hate,
Salutes the Queen of rare renown, whose goodly gifts Divine,
Through earth and air with glory great shall pass this trump of mine
And knowing of thy coming here, my duty bade me go
Before, unto this present place, the news thereof to show.
No sooner was pronounced the name, but babes in street 'gan leap,
The young, the age, the rich, the poor, came running all on heap;
And, clapping hands, cried mainly out, 'O blessed be the hour!
Our Queen is coming to the town with princely train and power!'
Then colours cast they o'er the walls, and decked old houses gay,
Out flew the bags about affairs that long a hoarding lay.
Aside they set their townish trash and work of greedy gain,
And turned their toils to sport and mirth, and warlike pastime plain,
As shall be seen to-morn * in field, that if your Highness please,
Where duty hath devised by art as show on land and seas,
To other matter yet unknown that shall explained be,
By such dom † sights and shows of war as there your Grace shall see.
Thus subjects mean to honour Prince whose sight they have enjoyed;
Most glad it is their hap to have their service so employed."

At the next gate stood Salutation, Gratulation, and Obedient Good-Will, each with a speech, but only two were delivered, as Obedient Good-Will "could not speak, time was so far spent" The Queen then entered her lodgings, where, "being settled," the three hundred soldiers who had waited on her "shot off their pieces in passing good order," and then the great artillery followed, "a hundred and thirty cast pieces." A guard of a hundred "shot" was appointed, and "her Highness rested that night"

For a description of the entertainment provided for the morrow, we must borrow at once from the author "A fort was made beyond the water in a ground fit for that purpose, and to the same as a friend (called Feeble Policy) joined by a little bastillion, builded on a hill, which was not strong by reason of the weak maintenance belonging thereunto to the which pile the soldiers of the main fort did repair Now must be understood that Dissention, passing between Wars and Peace (Wars being placed in sight), had certain speeches, as follows, which speeches could not be said in the hearing of the Prince, wherefore they were put into a book, and presented as hereafter you shall know Dissention to the city, to move them to arms, hath his speeches as these things were done in action" We must not, however, give the unspoken speeches, nor the speech nor the song delivered at the College on the intervening Sunday, when the Queen attended Divine worship according to her almost unvarying custom, though we may use parts of them, as the author asserts without them we must be "ignorant of the whole matter" A scaffold being placed over against the fort, and the Queen and her court being placed, Dissention addresses Peace and her followers, who were in the main fort, in praise of military prowess:—

"O people vain, that spend in peace your days,
To prowl about for pence and peevish pelt."

Telling them—

"If you abide at home till cannons roar,
The plaster comes too late to salve the sore;
Break down the banks that hold the waters in,
First strike thy foe, and so the brawl begin."

She next addresses Wars, "which was set in open view, with all orders of martial manner," exciting them against Peace, for that—

"Peace is bent to truss up soldiers all:
Wealth will no wars Peace is so proud, the people fears no fall.
* * * *
Peace calls you rogues, and swashing dicks, that stand upon your braves,
A swarm of wasps, a flock of wolves, a nest of thieves and knaves,
That live by spoil and murthers vile, and triumphs still in blood,
And have such hot and greedy minds, you thirst for neighbours' good.
The trumpets loud that slaughter sounds, and drums with rumbling noise,
Was never made for man of peace, but rather fit for boys
They say, whose childhood likes fond bruits, and loves such trifling toys
Will you, that kingdoms conquered hath, be now subdued by Peace?
Shall civil swains to loathsome gaol lead men like dogs in lace [leash]?
Shall peevish Peace and people weak o'ercome the soldier stout?
Shall loiterers lewd like rebels rail and manhood wax a lout?
Ah! fie, for shame, set hand on sword, in your behalf I blush,
Bid trumpet sound, advance the pick, and give proud Peace a push."

Upon this the Wars displayed themselves, marched down the hill, and attacked the little fort called Feeble Policy with great fury, won it, and razed it to the earth, notwithstanding the aid afforded by the main fort, their succours being repulsed, and they themselves ultimately besieged. This "drove out that day," and the Queen retired to her lodging by torchlight The next day the attack on the main fort was renewed A ship, coming with victuals, was chased by "three brave galleys," and the fort, reduced to extremity, apply to the Queen for assistance, by a gentleman who, for this purpose, actually "swam over the water in some danger, clothes and all," the broil continuing, "with a show of fight on land and sea," till night again Wars, having now "waxed a-weary," sends Persuasion to the main fort to induce them, with a speech, to admit the soldiers of Wars —

"The knife that cuts the finger sore in sheath about is borne,
The sword that takes away the life makes peace where it is worn
* * * *
So Wars where they are used well keeps world in fear and awe,
And shows more terror by his rage than all your rule of law"

The city, however, is unconvinced, and replies, placing the benefits and advantages of peace and commerce in an ingenious and forcible light —

"Our trade doth stand on civil life, and there our glory lies,
And not on strife, the ruin of states, a storm that all destroys,
A heavy bondage to each heart that freedom's fruit enjoys
* * * *
We venture goods and lives, ye know, and travel seas and land,
To bring by traffic heaps of wealth and treasure to your land
We are a stay and storehouse both, to kingdoms far and near
A cause of plenty through foresight when things were scarce and dear
And though our joy be most in peace, and peace we do maintain,
Whereon to Prince and realm throughout doth rise great wealth and gain.
Yet have we soldiers as you see, that stir but when we please,
And serve our turns in household things and sit in shop at ease;
And yet dare blade it with the best when cause of country comes,
And calls out courage to the fight by sound of warlike drums."

* *To morn*, to-morrow. † *Dom*, doomed or appointed

Persuasion was dismissed; the battery recommenced playing on the fort, which was at length reduced to straits, and an assault was given "in as much order as might be." The enemy were repulsed three times, and at length agreed to a parley, in which they proposed, as the fort was no longer defensible, "the curtain being beaten down,' that its defenders should have leave to depart with "bag and baggage." "To which the fort made answer, that the curtains nor bulwarks was not their defence, but the courage of good people and the force of a mighty prince, who sat and beheld all these doings, was the thing they trusted to; upon which answer the enemy retired, and so conditions of peace were drawn and agreed of, at which peace both the sides shot off their artillery in sign of a triumph, and so crying 'God save the Queen!' these triumphs and warlike pastimes finished. The Prince, liking the handling of these causes very well, sent two hundred crowns to make the soldiers a banquet. Now here is to be considered that the Prince went into the galleys and so down to King-road, ere these things were brought to an end."

After this extraordinary instance of the Queen's liberality and proof of her being well pleased she went first to Longleat, the seat of Sir Thomas Thynne, the ancestor of the present Marquis of Bath, thence to the seat of Sir Henry Charington, and thence on Friday the 3rd of September, to Wilton, the seat of the Earl of Pembroke near Salisbury. Her Highness was received by the Earl with a great number of his honourable and worshipful friends and a 'good band of men in all their livery coats" well horsed who "being placed in one rank in order one from another about seven feet and about fifteen feet from the highway occupied a great way, while another rank of the Earl's gentlemen's servant also on horseback, were ranged about a stone's cast behind. On her entering the outer gate of Wilton House a peal of ordnance was discharged on Rowlington, and the Countess, with divers ladies and gentlewomen, 'meekly received her Highness at the inner gate." The outer court being "beset on both sides the way with the Earl's men as thick as could be standing one by another through which lane her Grace passed in her chariot, and lighted at the inner gate." She remained here till Monday hunting on Friday a very wet day in Clarendon Park, and then proceeded to Salisbury, and so homeward.

We append a list of the jewels given to the Queen upon this Progress, as a curious specimen of the manners of the period. The custom was uniform but we have not considered it necessary to enumerate them on every occasion:—

"First, one jewel of gold garnished with diamonds and rubies and five pearls pendant, one bigger than the rest. Given to her Majesty by Sir Edward Umpton, Knight. The same delivered to Mr Secretary Walsingham by her Majesty's commandment.

"Item, a falcon or parrot, the body crystal, the head, tail, legs, and breast of gold; fully garnished with sparks of rubies and emeralds, hanging by a very short and small [a most invidious particular] chain of gold. Given by the old Lady Chandos.

"Item, a jewel, containing divers rubies and diamonds, wherein is a phœnix and a salamander of agate. Given by Sir John Young, Knight [the mayor of Bristol].

"Item, a falcon preying upon a fowl, with a great emerald in her breast, and a pearl pendant, with divers sparks of diamonds and rubies upon the wings and breast. Given by Sir John Thynne.

"Item, a dolphin of mother-of-pearl, garnished with gold, having a man upon his back, garnished with divers sparks of diamonds and rubies, hanging by two short chains of gold, and a cluster of ragged pearls pendant. Given by Sir Henry Charington, Knight.

"Item, an eagle of gold, enamelled green, garnished with divers diamonds and rubies, hanging at three short chains of gold, garnished with small sparks of diamonds and three diamonds pendant. Given by the Earl of Pembroke.

"Item, a mermaid of gold, having a maid upon her back, garnished with sparks of diamonds, with three short chains set with sparks of diamonds and rubies, with a diamond pendant, and little ragged pearls also. Given by the Countess of Pembroke the Younger.'

Montpellier.—Here we have southern suns and southern fruit, &c., but where—oh where are those charms of the South people rave about? I neither see nor feel any of them: no flowers, no luxuries—such a contrast to the north of Germany, where every house, or even cottage, has its balcony of choice flowers. In this attraction even gentlemen's houses are deficient. For the last few days the weather has been so suffocatingly hot we could scarcely bear any clothes on; last night it suddenly changed, obliged us to put four times the quantity of bed clothes, and even then I awoke shivering. Is this in reality the far famed Montpellier, whose name is connected in our northern minds with all that is beautiful, soothing, and cheerful? Oh, how much less pleasant is the original than all those lovely nooks and sunny slopes which bear the name of Montpellier in dear England! The glare and dazzle from white walls and roofs put me in mind of Brighton, but the air is not so pleasant nor invigorating as that of our famous bathing place.—*Lady Chatterton's Tour in the Pyrenees, &c.*

Flowers and Fruits of Australia.—Many fruits grow and flourish in these colonies which can be reared in England only when they are housed, when means are taken to temper the keenness of the winter's blast, and when the temperature of the air is increased by artificial contrivances. It is a matter of doubt, however, whether anything is gained by the inhabitants of New Holland in this particular, for many fruits which are admirably adapted to the temperature and moist climate of Great Britain, either do not come to perfection, or will not grow at all, in the dry hot atmosphere of New Holland. A decision on the relative advantages and disadvantages will depend in this instance on the tastes of the individual, and in arriving at a conclusion on this point the native of Great Britain must not forget to bear in mind, that every one is apt to attach somewhat more than its intrinsic value to that which is beyond his reach. For example, the Englishman will be in danger of forming a highly favourable opinion of the capabilities of that country for the growth of fruit, where the orange and the grape flourish and yield abundantly in the open air; but it will do him no harm to remember that if the Australian colonists gain the orange and the grape, they lose the apple, the currant, the gooseberry, and that most delicious of all fruits, the strawberry. As it is with fruits so it is with flowers. The native flowers are many of them exceedingly beautiful, and the geranium is almost a weed; but still very many of the sweetest and most beautiful English flowers will not grow in the climate of New Holland. The native flowers are, with very few exceptions, perfectly inodorous, and they gladden the eye with their grateful presence but for a short period. The dreary wastes of New Holland are relieved by the varied tints of the native flowers in the spring time only. But few persons, I apprehend, would estimate the beautiful but scentless, native flowers of New Holland beyond the more quiet tinted, but sweet-smelling, flowers of Great Britain. Even were they on a par in point of beauty and fragrance, the English flowers continue blooming a great part of the year, whilst the dull monotony of the arid shrubs of Australia is relieved for only a short time by beautifully formed and exquisitely tinted, but inodorous flowers. With all the charm of form, the Australian flowers must yield to the delicious fragrance and simple colouring of the flowers of the charming hedgerows of "merry England."—*Bartlett's New Holland.*



[illegible]

THE RIVER DUDDON

THERE are few objects in nature more beautiful or more refreshing to eye and ear than a mountain stream. To a healthy mind it almost seems to impart something of its own lively flow and bold and buoyant energy. Itself a happy emblem of the purity and vigour of poetic genius, it has ever been an especial favourite with all poets: our own noble band, from Spenser to Wordsworth, have celebrated it in snatches of description, or brief allusions, or fuller and more prolonged notes—

> "Murmuring near the running brooks
> A music sweeter than their own."

Southey, in speaking of one of them, says, "I could sit for hours to watch the motions of a brook." And he must be dull indeed who could wander without emotion along one that has been sung of by a great poet, or not have the feeling its natural beauty may arouse deepened by association with the genius it has inspired.

Last autumn we spent some time near the Duddon, the stream which forms the subject of Wordsworth's fine poem of that title; and it has occurred to us that we may be able to impart a little information to the admirer of his poetry, perhaps even to lead some of our readers who may be about to travel in the lake district to vary the usual route by devoting two or three days to exploring a stream so beautifully described by our great philosophic poet. The Duddon rises on Wrynose Fell, and divides the counties of Cumberland and Lancashire for about twenty-five miles, from its source till it enters the Irish Sea near the Isle of Walney. It is navigable only near its termination, and then but at high tide and by small craft; indeed throughout its course it is scarcely at all serviceable to man, hardly a mill being worked by it. Nor does it, like many other of the mountain-streams, anywhere expand into a lake or even a tarn; yet, even in this region of rivers it is perhaps unequalled. It runs through a remarkably wild and picturesque country, and presents aspects singularly varied considering the shortness of its course. Wordsworth, in his 'Scenery of the Lakes,' says, "It may be compared, such and so varied are its beauties, with any river of equal length in any country." However that may be, it is surpassed by none in the northern counties. Green, indeed, and he is no mean judge, places the Croglin and Eden first, while Southey puts in a word for his Keswick Greta, and every one remembers Scott's description of its Yorkshire namesake. It is, however, to none of these we are disposed to think Duddon must yield; but we are not so certain as to the Wharfe. Be that as it may, our stream is *very* beautiful, and it is surprising that so few visit it. Hardly one visitor of the thousand who annually resort to the lakes does more than cross it. The country on either side of it is thinly peopled, and the guides at Keswick and Ambleside will talk loudly of the badness of the accommodation, the rudeness of the inhabitants, and the roughness of the way. It can indeed only be explored on foot, and it must be confessed that there is neither an hotel nor a gentleman's house throughout; but though the way is somewhat rough and the people unpolished, the traveller who is willing to be pleased will find accommodation, civility, and plenty; and in these days it should be anything but an objection to a genuine lover of rural sights and sounds that the peasantry so little resemble townsmen. We are quite sure if any of our readers will try the course we point out, they will thank us for suggesting it.

We purpose to follow our stream from its source to its termination in the sea, taking Wordsworth's poem as our guide. The source of the Duddon is on the top, or nearly the top, of Wrynose Fell. The best way of approach to it is from Langdale: you ascend Wrynose at Fell foot by the old Whitehaven road, which is carried over nearly the highest part of Wrynose. When only pack-horses were used for the conveyance of goods in these parts, this was the main road from Kendal to Whitehaven; in fact the stranger who sees it finds some difficulty in crediting, so rough and acclivitous is it. When the top of Wrynose is gained, a small circle of stones, three of them somewhat larger than the others, will be seen on the right of the road: these are the 'Three-shire Stones,' marking the junction of the counties of Westmoreland, Cumberland, and Lancashire. They are one of the local wonders, and will be readily pointed out to the visitor. Passing these, the traveller must almost directly turn out of the road, leaving it on his left, and he will soon come upon the source of the Duddon. The water oozes up through a bed of moss, and unless care be taken, the real source may be overlooked and a wrong spot selected, there being several other moss-beds a little lower down the Fell. Wordsworth says of it (Sonnet III.)—

> *"How shall I paint thee?*
> . . . . Nature hath lent
> To thy beginning nought that doth present
> Peculiar ground for hope to build upon."

It is, however, no ordinary spot. On such a morning as that on which we visited it—cold, grey, and misty—the huge masses of crag which protrude from the ground, bare of everything but the grey lichen and a few straggling tufts of grass on their highest points, the dull russet clothing of the thin soil, the many mingled and brilliant colours of the wet mosses, the perfect quiet of the air, broken only for a moment by the motion of a sheep or two that have straggled here, hardly it should seem for pasture,—produce together so deep an impression of desolate solitude, as not to be soon forgotten. From this spot a slender thread of water finds its way down a narrow channel; it is, however, soon joined by one and another little streamlet, and begins very quickly to toss along its stony bed in that seemingly joyous mood so characteristic of mountain-streams. Long before it reaches the bottom of the Fell it has acquired a tolerable volume of water, and formed two or three pretty little water-breaks. Its course down the Fell is very tortuous, but if you have some time to spare by all means follow its "loosely scattered curves," nor forget sometimes to look back. Wordsworth has devoted a sonnet to these retrospective glances, and it is pleasing to observe how a simple and hitherto unnoticed object will start into beauty at the touch of a true poet, as in nature we often see when a sudden gleam of sunshine illumines some obscure feature of the landscape.

When it reaches the Fell foot, the broad rocky channel tells that though ordinarily but a trifling stream it must sometimes present a grand appearance. The mountains here form a sort of coomb, and in stormy wintry weather, or on the melting of the snow upon them, large quantities of water pour down on every side, bringing with them great masses of stone, which, as they are driven against the projecting crags on the mountain-sides, or against each other as they roll along the bed of the stream, make, we were told, a strange turmoil, and may often be heard at a considerable distance. Here our stream is joined by a small one that rises by Scawfell, and now it takes the name of Cockley Beck.* The traveller will here pause to admire the magnificent array of mountains on either hand, especially on the west, where they appear in their full majesty, the rugged outline of the Pikes of Scawfell forming a background of a grander kind than any other, perhaps, in the whole district. So grand is their appearance in this place that the lover of nature will be tempted to leave our stream for awhile, and wander up the dale towards them, and he will do well. At almost every step some new feature of greatness will present itself, and as the vale winds they will be seen in many various and striking combinations. They who would ascend Scawfell may do so without much difficulty from this vale. But we must return to our stream. Where it takes the name of Cockley Beck it is crossed by a bridge (called by the dalesmen Cockley Brig, as the stream is called Cockley Beck), which leads to a small farmhouse, the "Cottage rude and grey" of which Wordsworth speaks in his 5th Sonnet, but the "ruddy children" will be looked for in vain—three and twenty years have not passed away without doing their work with them. As the way has been rather long and toilsome, the tourist will do well to enter the cottage; he may be sure of a welcome and some plain refreshment, and may gain what is always worth acquiring, a little insight into the manners of the people through whose neighbourhood he is journeying. It is indeed worth a stranger's while to take some such opportunity to observe the natives of Donnerdale, as the district through which the Duddon flows is called. Our dalesmen are reserved, and must be watched to have their real character caught; but the observer will not go unre-

* *Beck* is the name for a mountain-stream throughout the north of England.



[Cockley Brig.]

wanted. They are a fine intelligent race of men, and worth observing: hardly so intelligent, perhaps, as the genuine mountaineer, and not near so hearty; their reserve is sometimes too near akin to sullenness, and they have not the same sly quiet humour. The mountain shepherd, too, is not only keener, but more thoughtful; indeed, if you can lead him to throw off somewhat of his reserve, you will find often a depth and extent of thought little anticipated, often, too, a genuine appreciation of the grand and beautiful in nature, with something of a poetic feeling, mingled, it must be confessed, with not a little superstition—but that, some say, is a chief element in the poetic character. The dalesman has not so much elevation of character, and it will require but little observation to see that a rigid economy verging on parsimony is practised by him, but it is chiefly in the matter of money—a rare article, and carefully husbanded. He abounds in social virtues, and we were told many little circumstances that showed his genuine sympathy with trouble, and his disregard of self in his attempts to relieve it. He is *neighbourly* to a degree only understood in a thinly peopled district. His hospitality—simple, but hearty—we often tested, and always found ready; and though in other matters even more parsimonious than the men, in this the women are by far the most liberal. To be a stranger is always claim enough, and readily acknowledged. They seldom go far from their homes, and seem to have a feeling almost of pity for those who are distant from theirs. Here, at Cockley Brig farm-house, for instance, we were served with milk and oaken cake, and while partaking of it we tried to gossip a little with the old dame, but she was, as the dalesmen say, very *short* till her own curiosity began to be excited as to our home, and even then it was amusing to see how cautiously she tried to worm out the desired information. "Ye'r no much used to these crags" she began, but determined to be for awhile as brief as she had been, we replied, "Not much." "Whar do'e gang fra?" "Wide of this," said we. "Ye coom fra Cockermouth, perhaps?" "No, we are from the South." "Fra Liverpool?" "No, from London." "Nay," said she in a tone of mingled surprise and sympathy, "but t'ou *art* a lang way fra hame!" Then setting before us all the good things the house could afford, she pressed us again and again to eat, repeating every moment, "Dinna ta stint ta sel." And we had some difficulty in convincing her that, as we had fixed our quarters at Seathwaite, we were in no great danger of starvation. The phraseology of the dalesman is very singular; they apply words almost as strangely as Americans are said to do. We heard two shepherds, as they were sitting by the public-house fire at Seathwaite, talk about some sheep they had seen at market that day:—"'Twas a terrible gurt (great) sheep that," said one. "Ay," replied his companion, "'twas a maist serious grand sheep indeed." And this is by no means an extreme specimen.

[To be continued.]

EFFECTS OF COLD UPON THE HUMAN BODY.

The effects of cold upon the human body are phenomena which do not present themselves to our notice in a marked degree in this country. We have certain popular notions respecting the efficacy of snow when rubbed on any part of the body which has been severely attacked by frost; and there are certain well-known narratives, such as that of Elizabeth Woodcock (see 'Penny Magazine,' No 634), which tend to show the power of snow as a preservative under very formidable difficulties; but the awful effects of intense frost are happily spared to the inhabitants of our climate. The treatises and essays of Dr. Whiting, Sir B. Brodie, Dr. Currie, Mr. Winslow, and other writers on this subject, contain details which afford us a glimpse of the effects sometimes experienced.

One of the most remarkable effects of intense cold is the lethargy which it induces: the colder the patient becomes, the more insensible he is that he is cold at all; all his faculties seem as it were frozen up, and if not roused, he dies from sheer stagnation of the vital energies. Many instances have been recorded illustrative of this effect. Dr. Whiting narrates a circumstance which once befel the celebrated traveller Dr. E. D. Clarke, who communicated the details to him. Having performed divine service at a church near Cambridge, in the afternoon of a very severely cold snowy Sunday, in the year 1818 or 1819, Dr. Clarke mounted his horse for the purpose of returning home. Soon finding himself becoming very cold and sleepy, and knowing well the danger of giving way to sleep, he put the horse into a fast trot, hoping by that means to arouse himself from the alarming torpor which was coming over him. This means was unavailing, and then fearing that he should soon fall from his seat, he dismounted, and determining to use every effort to resist sleep, put the bridle under his arm, and walked as rapidly as he could. This, however, did not long succeed; the bridle dropped from his arm, his legs began to falter, and he was just sinking down upon the snow, to rise perhaps no more, when a gentleman who knew him came up to him in a gig, and rescued him from his perilous situation. He passed a restless night after this adventure, and felt languid and feverish on the following day.

In many foreign countries this soporific effect of cold has been much more frequently exhibited. Captain Cook has left an interesting account of an incident which occurred in December, 1769, when Sir Joseph Banks, Dr. Solander, and other naturalists, being in the ship *Endeavour* off the coast of Terra del Fuego, wished to make a botanical excursion upon the hills on the coast, which appeared to be not far distant. The party, consisting of eleven persons, were overtaken by night on the hills during extreme cold. Dr. Solander, who had crossed the mountains which divide Sweden from Norway, knowing the almost irresistible desire for sleep produced by exposure to great cold, more especially when united with fatigue, enjoined his companions to keep moving, whatever pain it might cost them, and whatever might be the relief promised by an indulgence in rest. His words, quoted by Captain Cook, were, "Whoever sits down will sleep, and whoever sleeps will wake no more." Thus admonished, they pushed forwards, but whilst still upon the bare rocks, and before they had got among the bushes, the cold suddenly became so severe as to produce the effects that had been dreaded. Dr. Solander himself was the first who found the desire to sleep irresistible, and insisted on being suffered to lie down. Sir Joseph Banks entreated and remonstrated in vain. Dr. Solander lay upon the ground, which was covered with snow, and it was with the greatest difficulty that he was kept from sleeping. Richmond, one of the black servants, suffered extremely from the severe cold, and had a strong inclination to sleep. Sir J. Banks sent five of the company forward to get a fire ready at the first convenient place they came to; and himself, with four others, remained with the Doctor and Richmond, whom, partly by persuasion and partly by force, they carried forward, but when they had got through the birch and swamp, they both declared they could go no farther. Sir Joseph had again recourse to entreaty and expostulation, but without effect. When Richmond was told that if he did not go on, he would in a short time be frozen to

death, he replied that he desired nothing but to lie down and die. Dr. Solander was not so obstinate, but expressed a wish to go on, if they would first allow him to take some sleep; although it was he himself who had before told them that to sleep was to perish. Sir Joseph Banks and the party found it impossible to carry them, and they were consequently suffered to sit down, being partly supported by the bushes; and in a few minutes they fell into a profound sleep. Soon after, some of the people who had been sent forward returned with the welcome intelligence that a fire had been kindled about a quarter of a mile farther on the way. An attempt was made, which happily succeeded, to rouse Solander, when it was found that although he had not slept five minutes, he had almost lost the use of his limbs, and the soft parts of his feet were so shrunk that his shoes fell from them. He consented to go forward with such assistance as could be rendered to him; but no attempts to relieve Richmond were successful: he, with another man of colour left with him, died. Several others began to lose their sensibility, having been exposed to the cold near an hour and a half, but the fire recovered them.

There are instances in which exposure for a long period to water just on the point of freezing has not produced this drowsy effect; and it may be possible that the water is a means of preventing that which might occur in the open air. Dr. Currie narrates a catastrophe, in which an American vessel was shipwrecked on the coast of Ireland; the greater part of the crew, fourteen in all, were left for twenty-three hours almost entirely under water, the temperature of which was about 33° or 34°, and yet they experienced no sensation of torpor. Here, although the exposure must have been intensely distressing, yet the degree of temperature was such as to take the incident rather out of the class which we are considering; for it is certain that the degrees of cold to which Clarke and Solander were respectively exposed must have been very much below that here indicated. With respect to the cause of torpor from cold, Dr. Whiting, after noticing the numbness of the fingers and toes to which many persons are regularly subject in the winter, remarks:—"The very great diminution (almost suspension) of sensibility in such cases may arise in some measure from a want of the necessary supply of blood to the extremities of the nerves; as it is an undoubted fact that their sensibility is greatly regulated in its degree by the quantity of blood circulating through the capillaries. It may also in part depend on the direct effect of the cold on the nerves themselves; but that this action on the nerves is not the only cause of the torpor is rendered probable, if not proved, by the fact that if artificial warmth be applied so as to bring the fingers to their natural temperature, the sensibility will not return until the circulation is restored. The whole surface of the body becomes less sensible to the touch under the influence of a great degree of cold, and the sense of taste is sometimes blunted. But further, when a still greater effect is produced, the brain loses its energy, and an irresistible desire to sleep ensues. Here we may again observe, that it is hardly possible to determine whether this is the direct result of the action of the cold as a sedative on the brain, or whether it depends on a want of the due supply of blood to that organ, on account of the diminished action of the heart."

In respect to the question, how great a degree of cold the human body can bear without injury, it is found that there are many circumstances, both constitutional and temporary, that prevent us from arriving at correct results. Sir John Ross remarked, during his Polar expedition, that the power of resisting a low temperature was very different among the members of his crew; and that he was always able, after a little practice, to predict who would suffer from degrees of cold which others would despise. Tooke, in his 'View of the Russian Empire,' while speaking of the sledge-drivers, remarks that these men and their horses, during extreme cold, feel little or no inconvenience in pursuing their employment along the roads, though the beards of the former and the muzzles of the latter are covered with hoar-frost and little icicles from the congelation; and they travel all day in the severest cold of that northern climate without receiving any detriment. The Russian women, too, even when the air is 20° or 24° below the freezing-point of Reaumur, will stand rinsing linen through holes in the ice, for five or six hours together, often barefooted, with their hands dipping in the water all the while, and their draggled petticoats stiff with ice. There are abundant means of observing that a degree of cold which would be deemed very rigorous and severe by some, is spoken of as being mild by others, and this both in relation to individuals and to whole nations.

The intensity of the action of cold upon the body depends largely on the circumstance whether the cold air is still or in motion: in other words, whether there is wind blowing. In Chili there prevails, during certain seasons of the year, a wind so impetuous and cold, that men and animals, exposed to its influence, become completely benumbed, and lose almost every trace of sensibility. Sir Edward Parry, Sir John Ross, and other Arctic voyagers have described the piercing and almost unbearable character of the cold of those regions when accompanied by wind. Parry says—"With the thermometer at 87° below the freezing-point (a fearful degree of cold), and no wind stirring, the hands may remain uncovered for ten minutes or a quarter of an hour without inconvenience; while with a fresh breeze, and the thermometer nearly as high as zero, few people can keep themselves exposed so long without considerable pain."

Different states of the body or mind, or both, influence greatly the power of resisting cold. Mr. Winslow observes on this point:—"Everything that strongly excites the mind, and concentrates the attention or the passions towards any particular object, renders the body to a certain degree insensible to the effects of cold. The lover braves the rigour of a freezing night with impunity, in order to enjoy a sight of the idol of his affections. The fashionable lady, desirous of pleasing, exposes herself, thinly attired, to intense cold, without being conscious of any unpleasant sensations. The hunter forgets everything in the enjoyment of the chace: we see him freely exposed to the north-east wind in the depth of the coldest winter, plunging into icy marshes, traversing the valley cold and wet, penetrating the woods without complaining of the temperature. The astronomer, intent on the object of his sublime science, neither feels nor is injured by the damps or chillness of the night." Dr. Currie remarks that in certain states of excitement of the brain and nerves, cold is resisted in an extraordinary degree; and he adduces instances in proof of it. A state of intoxication is one among the circumstances which render the human frame very susceptible to the effects of cold. Le Beaupré mentions a terrible disaster consequent on a *fête* which was given at St. Petersburgh by a farmer-general of distilled spirits, during the administration of Potemkin; at which *fête* fifteen or eighteen hundred persons, who had committed too great excesses in drinking spirits, perished miserably from cold in the squares and streets of the city! On the other hand, excessive cold often produces an effect

upon the intellect which gives rise to a suspicion of intoxication. Sir Edward Parry relates the case of a man who was exposed for nearly a whole night to the influence of extreme cold. When he was brought on board the vessel, and spoken to, he looked wildly, spoke thick and indistinctly, and it was impossible to obtain from him a rational answer to any question that was put to him. He had every symptom of a man who had been drinking too freely. Sir Edward further remarks on this point:—"To those who have been much accustomed to cold countries, this effect will not appear singular; but I cannot help remarking that many a man may have been punished for intoxication who was only suffering from the benumbing effects of frost; for I have more than once seen our people in a state so exactly resembling intoxication, that I certainly should have charged them with that offence had I not been quite sure that no possible means was afforded them on Melville Island to procure anything stronger than snow-water."

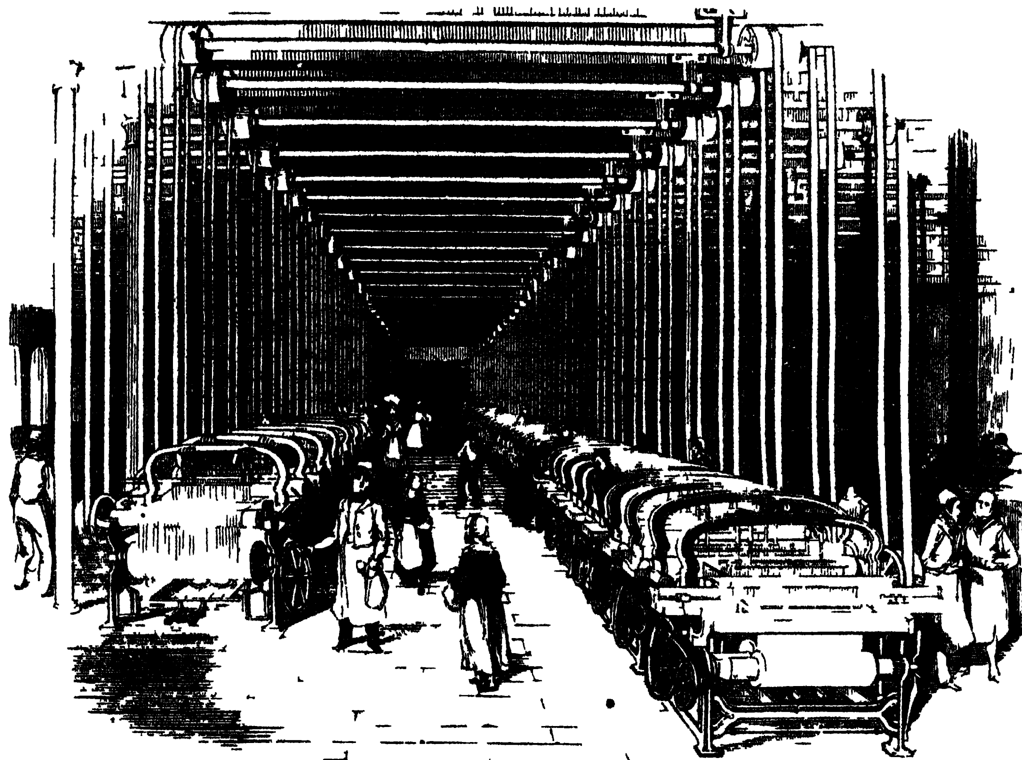
In respect to that last extremity of cold, whose effects are expressed by the awful phrase "frozen to death," the retreat from Moscow probably afforded the most fearful instance on record. Four hundred thousand men crossed the Niemen in June, 1812, and but thirty thousand re-crossed it in December, the remainder having been killed, part by war and part by cold. M. Beaupré, while describing the events of this disastrous retreat, and the yearnings of the poor soldiers to obtain a sight of a bivouac fire, says:—"I saw them, sad, pale, despairing, without arms or caps, staggering, scarce able to sustain themselves, their heads hanging to one side, their extremities contracted, setting their feet on the coals, lying down on hot cinders, or falling into the fire, which they sought mechanically, as if by instinct. Along the road were seen, in the ditches and fields, human carcasses heaped up and lying at random, in fives, tens, fifteens and twenties, of such as had perished during the night, which was always more murderous than the day." In the night following the day when the French army left Smolensko, Beaupré was retreating with the rest, and he says:—"I sat down on the trunk of a birch, beside eight frozen corpses, and soon experienced an inclination to sleep, to which I yielded the more willingly as it then seemed delicious. I was fortunately aroused from that incipient somnolency, which would infallibly have brought on torpor, by the cries and oaths of two soldiers opposite, who were striking violently a poor exhausted horse that had fallen down. I emerged from that state with a sort of shock; for the sight of what was beside me recalled strongly to my mind the danger to which I exposed myself." Beaupré gives many instances to show the instantaneous effect which the cold had sometimes upon the soldiers of that devoted army. He says that at Smolensko the temperature was so rigorous, that more than thirty grenadiers of the Italian guard fell frozen as they attempted to form themselves in line on the heights beyond the Borysthenes.

Breakfasts at Tortola.—Your breakfast within the tropics is a meal "fit for the Shah." In most houses they bring one coffee at daylight in porcelain cups, just the antique articles that at home are seen in grandmamma's closet, far too valuable for use; and this taken commonly at the toilet, whets the stomach for a more substantial refection about nine o'clock. The hall-table then appears decked à la fourchette, with veal patés, a chicken, or tête de veau garnished with an excellent Yorkshire tongue or Bologna; while sliced plantain, that should be eaten from the embers hot as lava, and the fine squashes they boil here, attend as substitutes for our potatoes. At times, indeed, we get them from Scotland; generally, however, of indifferent quality, those imported by the packet seldom reach us. Then again there is broiled fish, barracouta, an omelet, or the fine avocado pear, called among the military subaltern's butter, for the sharp-set. I have also seen radishes here, villanously tough, and water-cress equal to any elsewhere. The bread consists of French rolls and the common island loaf, that smacks of garlick and the leaven used in it, but eats passing well with our rich dairy produce. Tortola is remarkable in this respect; and for those who can digest the grossness of what are brought to table as Johnny cakes, this part of the déjeuné will have large attractions. Our liquids are chocolate, café au lait, with, in many parts, their constant attendant, claret; tea does not often appear at this meal. Lastly, you find a sweet cake, and salvers with honey or Barbados ginger in preserve, set on enticingly at the close, but which wind up the business rarely.—*Letters from the Virgin Islands.*

Ignorance the great Obstacle to Social Improvement.—Of all obstacles to improvement, ignorance is the most formidable, because the only true secret of assisting the poor is to make them agents in bettering their own condition, and to supply them not with a temporary stimulus, but with a permanent energy. As fast as the standard of intelligence is raised, the poor become more and more able to co-operate in any plan proposed for their advantage, and more likely to listen to any reasonable suggestion, and more able to understand, and therefore more willing to pursue it. Hence it follows, that when gross ignorance is once removed, and right principles are introduced, a great advantage has been already gained against squalid poverty. Many avenues to an improved condition are opened to one whose faculties are enlarged and exercised; he sees his own interest more clearly, he pursues it more steadily, and he does not study immediate gratification at the expense of bitter and late repentance, or mortgage the labour of his future life without an adequate return. Indigence, therefore, will rarely be found in company with good education.—*Bishop of Chester's Records of the Creation.*

Size and Cost of the Great Pyramid.—The Great Pyramid originally occupied an area equal to 588,939,595 superficial feet, or almost thirteen and a half English acres, the side of the square being 767,424 feet. The original perpendicular height of this structure was 479 feet, and the total contents of solid masonry equal to 89,418,806 cubic feet, weighing 6,878,369 tons. Taking the masonry at only one shilling a cubic foot, including carriage, materials, and workmanship, the cost of such a structure would be 4,470,940*l*. Again, the masonry of the Great Pyramid would be sufficient for the erection of 1120 columns, each twenty feet square and of the height of the Monument of London, which is 202 feet; or if cut into paving-stones four inches in thickness, would cover a space equal to 6158 acres. The blocks of which this great work is composed are roughly squared, but built in regular courses, varying from two feet two inches to four feet ten inches in thickness, the joints being properly broken throughout. The stone used for casing the exterior, and for the lining of the chambers and passages, was obtained from the Gebel Mokattam, on the Arabian side of the Valley of the Nile; it is a compact limestone, called by geologists "swine-stone" or "stink-stone," from emitting, when struck, a fetid odour, whereas the rocks on the Lybian side of the valley, where the pyramids stand, are of a loose granulated texture, abounding with marine fossils, and consequently unfit for fine work, and liable to decay. The mortar used for the casing and for lining of the passages was composed entirely of lime; but that in the body of the pyramid was compounded of ground red brick, gravel, Nile earth, and crushed granite, or of calcareous stone and lime, and in some places a grout, or liquid mortar, of desert sand and gravel only has been used. It is worthy of especial notice, that the joints of the casing stones, which were discovered at the base of the northern front, as also in the passages, are so fine as to be scarcely perceptible. The casing stones, roughly cut to the required angle, were built in horizontal layers, corresponding with the courses of the pyramid itself, and afterwards finished as to their outer surface, according to the usual practice of the ancients. In order to ensure the stability of the superstructure, the rock was levelled to a flat bed, and part of the rock was stepped up in horizontal beds, agreeing in thickness with the courses of the artificial work.—*Athenæum.*

A DAY AT A COTTON-FACTORY.



[Power Looms.—Cotton Manufacture.]

If we take the town of Manchester as a centre and draw around it a circle of ten miles radius, we shall find within that circle the seat of the most extraordinary manufacture which the world has yet witnessed: extraordinary in relation to the annual amount of property produced, to the effects which that property has wrought on the social features of the district, and to the mechanical inventions whereby the manufacture has been founded. We allude, of course, to the COTTON manufacture. At a period which may be remembered by persons yet living, the quantity of raw cotton worked up in Britain was about three millions of pounds annually: it is now three hundred millions. At a period not very much earlier, it employed a spinner one year to produce as much yarn as he can now produce in about a day. In 1760 not more than forty thousand persons are supposed to have been employed in this manufacture: there are now, in all its various branches, considerably above a million. In 1760 there was, perhaps, not a single yard of cotton goods exported; whereas in recent years the exports of cotton have nearly equalled all our other exports put together. And, lastly, at the present day the population of the manufacturing district is four times as great as it was at the former period.

Should it be asked why this district is so distinguished as the seat of the cotton manufacture, we may perhaps be correct in saying that the circumstance is due to a number of different causes. For instance, five centuries ago, when Edward III. married the daughter of the Earl of Hainault, he invited a number of Flemish clothiers to come to England; and they, settling at Bolton, within the district which we have marked out, established the processes of spinning and weaving there. Again, when the revocation of the Edict of Nantes drove many weavers from France, in 1685, many of these settled at and near Bolton; and although both of these immigrations relate more to the history of the *woollen* than to the *cotton* manufacture, yet they laid a foundation for the modern improvements in both. Then, again, the physical character of the district presents marked facilities for such a manufacture: the hilly range which separates Lancashire from Yorkshire gives rise to numerous streams, which before they reach the estuary of the river Mersey give motive power to water-wheels and a supply of water to bleach-works and dye-works such as has no parallel for extent in any other country. It has been said that the Mersey and the Irwell are the two hardest-worked rivers in the world. We may also adduce the existence of coal in abundance in the county, and iron in adjacent counties with which there is easy communication, as causes for the settlement of the cotton manufacture here. We must not forget, too, that Liverpool, one of the most admirably situated ports in the kingdom, is in the immediate vicinity of the cotton districts, serving at once as a depôt for the imported raw material and for the exported finished goods. Lastly, we might be expected to mention the canals and railways which intersect this district in unparalleled abundance; but these are rather *consequences* than *causes* of the location of the manufacture.

We may regard this district as one huge town, almost as one huge factory; for there is such a con-

necting link between Manchester as a centre, and Bolton, Bury, Rochdale, Oldham, Ashton, Stayley Bridge, Hyde, Stockport, &c. as branches, that we cannot properly appreciate the one without noticing the others. Let us, then, beginning at the centre, take a rapid glance at this wonderful scene of industry.

If we take our station in Market Street, Manchester, at the west end of which is the Exchange, we are immersed in the very heart of the whole system. We have around us the wholesale 'warehouses' and offices wherein is transacted all the business between the dealers, the manufacturers, the spinners, the bleachers, the calico-printers, &c., whether of Manchester or of any of the surrounding towns. One street especially, viz. Mosley Street, presents a curious index to the whole arrangement. Here almost every house is occupied in the way stated: no manufactures are carried on; no retail shops exhibit the manufactured goods; but every house, and almost every floor of every house, constitutes the business-establishment for some large manufacturing firm. The houses were once small and humble; but the value of room in Manchester has increased so rapidly, that it has been a profitable speculation to rebuild nearly the whole of them in this street on a large and elegant scale. So thoroughly developed has the system become, that it is not found necessary to keep a large stock of manufactured goods at these places. A bargain is struck, say for ten thousand pieces of calico, as per sample: and this may be done in a small room, between the manufacturer and the dealer, while the goods are perhaps at that moment being manufactured at Bolton, or Ashton, or Stockport. Even the kitchens or cellars, as they would be termed in other places, are warehouses or counting-houses, and may be rented by a calico-printer, while the ground-floor constitutes the place of business for a fustian manufacturer, the first floor for a spinner, the second for a muslin manufacturer, and so on.

The admirable manner in which the wholesale Manchester business is now conducted, has been the growth of experience. Dr. Aikin, fifty years ago, separated the history of Manchester, as regards the position of its manufacturers, into four epochs, and these will give us some insight into the gradual changes in the agency of a mercantile system. The first epoch he places anterior to about the year 1690, when the manufacturers worked hard merely for a livelihood, without having accumulated any capital; and Aikin supposes that there were few or no manufacturers who had accumulated so much as 3000*l.* or 4000*l.* The second epoch began about the year just named, and lasted, say till 1730. The manufacturers during this epoch began to acquire little fortunes, but worked as hard and lived in as plain a manner as before, increasing their fortunes as well by economy as by moderate gains. They began to build modern brick houses, in place of those of wood and plaster. They confined their trade to the wholesale dealers of London, Bristol, Norwich, Newcastle, and Chester. Aikin says:—"An eminent manufacturer of that age used to be in his warehouse before six in the morning, accompanied by his children and apprentices. At seven they all came in to breakfast, which consisted of one large dish of water-pottage, made of oatmeal, water, and a little salt, boiled thick, and poured into a dish: at the side was a pan or basin of milk, and the master and apprentices, each with a wooden spoon in his hand, without loss of time, dipped into the same dish, and thence into the milk-pan; and as soon as it was finished they all returned to their work. In George I.'s reign, many country gentlemen began to send their sons apprentices to the Manchester manufacturers."

Dr. Aikin's third epoch is from about 1730 to the era of Arkwright's inventions. The marked feature of this epoch was the manner in which the manufacturers 'pushed' for orders. At first the chapmen or dealers used to keep gangs of pack-horses, and to drive them to the principal towns with goods in packs, which they opened and sold to shopkeepers; lodging what was unsold in small stores at the inns, and taking back sheep's wool to the manufacturing district. By degrees, however, turnpike-roads were improved, waggons were laden, instead of pack-horses; and the chapmen only rode out for orders, carrying with them patterns in their bags. In the former epoch, country districts were supplied from the five or six large towns which received goods direct from Manchester, each acting as a centre to the surrounding counties: but now the manufacturers began to send their riders to every part of the kingdom soliciting orders.

The fourth epoch was consequent on the introduction of machinery into the manufacture. The trade became so large, that partners in commercial firms went to reside in London or on the Continent: foreigners and London merchants sent agents to reside permanently at Manchester; agents, factors, and brokers were established, some at Liverpool and some at Manchester, to manage the transactions between the Liverpool merchant and the Manchester manufacturer, both in respect to the raw cotton and to the manufactured goods: all the manufacturers around Manchester agreed to make that town their mart, and to appoint certain days of the week as 'market-days' with each other; and Manchester became, what it has ever since continued, one of the wealthiest towns in the empire.

When we depart from the mercantile focus of Manchester, and walk in any direction towards the suburbs, we come in sight of the cotton-factories, those enormous brick structures which excite such astonishment in the mind of a stranger. There are nearly two hundred of these vast piles in the immediate vicinity of the town. One or two canals pass through Manchester, and the factories are generally situated in convenient proximity to these canals. A first-rate cotton-factory, with its machinery, costs very little short of a hundred thousand pounds; and a slight guess may hence be made at the value of the whole. The division of the town near the Oldham Road is especially full of these large factories; and the scene which is presented when the operatives leave these factories to go to their meals is one of the most striking that can be conceived; the busy hive pours forth in a stream from each building, some of which employ more than a thousand hands; and in a few minutes all have reached their homes, in small streets near the factories.

Departing still farther from the centre, we see ample evidence of the commercial character of the district, in the numerous railway-stations which the outskirts of the town exhibit, each leading to some busy tributary to the giant depôt of manufactures. On the west, we have the station of the railway to Liverpool and Warrington; on the north-west, that of the railway to Bolton and Bury; on the north-east, that to Oldham, Rochdale, and Leeds, on the south-east, that to Ashton, Staley Bridge, and Sheffield; and finally, that to Stockport and London. A vast traffic is carried on by means of these lines of railway, especially from Manchester to the towns in its vicinity, both as respects passengers and goods.

If we next enlarge the radius of our visit, and pass from town to town of the 'cotton district,' we shall have the means more and more of appreciating the extent to which the system is carried. Say that we proceed north-westward, to Bolton, a distance of about ten miles. Here we come to a town which, in connection with the history of the cotton manufacture, is second to Manchester, and in some respects even takes precedence of it. Bolton was once the centre of the

district, as Manchester now is, and was noted for its textile fabrics many centuries ago. Leland, writing in 1552, says:—"Bolton upon Moore Market stondith most by cottons, and course yarne. Divers villages in the Moors about Bolton doe make cottons." It is now known, however, that the goods which obtained the name of 'cottons' in those times, were really a kind of woollen; and that the first undoubted evidence we have of the real cotton manufacture in England dates back to the year 1641 only, just above two centuries ago. Bolton, in bygone times, had its warehouses, where dealers were wont to come from all the surrounding towns; a system which has been superseded by the concentration of the wholesale dealings at Manchester; but Bolton still holds its rank as one of the most important towns of the series. There were, in 1838, more than seventy cotton-factories in Bolton parish; and there are more than twenty large bleach-grounds within five miles of Bolton.

There is a pleasant walk of three or four miles northward from Bolton, which we will notice because it enables us to show that some of the factories, situated out of the dense mass at Manchester, are more favourably circumstanced than many readers are apt to suppose. In walking along the road from Bolton to Turton, which is a thoroughly open and country district, we arrive at a spot where a gentle range of hills separates the road from a valley through which a small river flows. On one of these eminences is a pretty church recently built, and just beyond it is a small village of cottages, mostly new, almost wholly occupied by persons employed in a neighbouring cotton factory. The factory is in the valley just spoken of; and the house of one of the proprietors is on a gentle eminence between it and the village. There is a school-house or room, supported partly by the proprietors of the factory, and there are chapels in the village for the principal denominations of Christian sects. The factory is bounded on every side by green fields, and being situated on the banks of the little stream, receives its motive power from thence by means of a magnificent water-wheel sixty feet in diameter, the largest or nearly the largest in the kingdom. The employers and the employed live near each other, and all are located in a spot where there are as many green fields and as much blue sky, as pure rivulets and as pure air, as if no such place as a factory were near. In Manchester itself the factories are certainly and necessarily surrounded by smoke and bustle; but there are four times as many factories beyond the limits of Manchester as there are within those limits; and many of this larger number are analogous in their position to the one above described.

If, leaving Bolton, we direct our attention eastward, a distance of four or five miles brings us to Bury, another of the busy manufacturing towns. Nearly a hundred and twenty cotton-factories were, in 1838, enumerated in the parish of Bury, comprising the town and its environs. But Bury is perhaps still more celebrated for its print and bleach works than for its spinning and weaving factories. It was here that the first Sir Robert Peel, father of the present premier, established several print-works (*i.e.* 'calico-printing' establishments), and laid the foundation for the fortune of his children; there are members of the Peel family yet residing there, although some of the works have passed into other hands.

Bolton and Bury, besides their present rank as manufacturing towns, have contributed their full share, and more than their share, to the inventions by which the manufacture has been enabled to attain its present vast extent. It was to John Kay, of Bury, that the weavers are indebted for the 'fly-shuttle,' by which the weft-thread is thrown across the warp with so much more facility than by the old method. It was to his son, Robert Kay, also of Bury, that we owe an ingenious contrivance by which three or four different coloured threads can be used in weaving with great facility. It was Whitehead, of Bury, who introduced the plan of 'piecening,' by which much time is saved in spinning cotton. It was a Bolton barber, Richard Arkwright, who was mainly instrumental in placing the manufacture in its present position, and the wealth of whose son has recently so astonished the world. It was Crompton, of Bolton, who invented the 'spinning-mule,' and whose house is still shown near that town, in which he used to work secretly in his garret, until inquisitive persons, by mounting ladders to look in at his window, discovered the secret of his machine and robbed him of the fruit. It was also in this immediate neighbourhood that Hargraves, the inventor of the 'spinning-jenny,' endeavoured to introduce his machine, and experienced the fate which so often attends inventors, viz. persecution.

A little north-east of Bury lies Rochdale, another important member of the series. In the parish including the town and environs, there are about a hundred factories, as well as extensive bleach and print works. Rochdale has, however, been remarkable rather for its woollens than its cottons.

From Rochdale we may turn southward, and we shall there find an immense amount of factory operations going on. Rochdale and Oldham are both approached from Manchester by way of the Manchester and Leeds Railway, and an easy and constant communication is thus kept up. Oldham parish, which is a large one, contains no fewer than two hundred cotton factories, and carries on a large manufacture not only in cottons but also in woollens and in hats. Oldham is a place which retains many characteristics such as in other places have been rubbed off by the friction of intercourse with larger towns. Among these the dress of the operatives is observable. The writer happened to be opposite to one of the factories of Oldham on a May evening when the people were leaving work, and was struck with the universal use of *handkerchiefs* instead of *bonnets*, as a head-covering for the women and girls; while both sexes, almost without exception among several hundreds, wore wooden clogs with brass buckles or clasps. Wooden clogs have been much worn in Lancashire ever since the Flemish clothiers located there, and appear to have become smarter than they were originally; but in most of the towns they are gradually giving way to the use of leather.

Proceeding a little farther southward, we come to that extraordinary knot of manufacturing towns, Ashton, Stayley Bridge, Duckinfield, and Hyde; a group which displays perhaps more remarkably than any others the effects of the progress of the cotton manufacture. We here come to the banks of the Mersey, that small but mighty river, which, separating Lancashire from Cheshire throughout its whole extent from hence to the sea, feeds more factories, perhaps, than any other river in any other country. At the extreme south-east corner of Lancashire, where it joins Cheshire and Yorkshire, lie these four towns, two on the Lancashire side and two on the Cheshire side of the Mersey. Ashton in 1775 contained five thousand inhabitants; in 1831 it contained more than thirty thousand. Stayley Bridge in 1748 contained forty-eight houses and one hundred and forty people; it has now twenty thousand inhabitants. Hyde in 1770 contained one dwelling-house and one chapel, while Duckinfield was at the same time designated as a "pleasant country spot;" now they contain some of the largest factories in the whole district, and an extensive population. These towns being, as has been

said, on the banks of the Mersey (or rather the Tame, for although the same river, it is not called the Mersey till it reaches Stockport) have water communication with Liverpool; while three canals in the neighbourhood connect them with Manchester, Huddersfield, and Derbyshire. At one of these towns, or rather manufacturing villages, viz. Hyde, there is a group of factories which were thus spoken of by Dr. J. P. Kay in a work on the 'Moral and Physical Condition of the Working Classes employed in the Cotton Manufacture in Manchester' published a few years ago:—'Twelve hundred persons are employed in the cotton factories of Mr. Thomas Ashton of Hyde. This gentleman has erected commodious dwellings for his work-people, with each of which he has connected every convenience that can minister to comfort. He resides in the immediate vicinity, and has frequent opportunities of maintaining a cordial association with his operatives. Their houses are well furnished, clean, and their tenants exhibit every indication of health and happiness. Mr. Ashton has also built a school, where 640 children, chiefly belonging to his establishment, are instructed on Tuesday in reading, writing, arithmetic, &c. A library connected with this school, is eagerly resorted to, and the people frequently read after the hours of labour have expired. An infant school is, during the week, attended by 280 children, and in the evenings others are instructed by masters selected for the purpose. The factories themselves are certainly excellent examples of the cleanliness and order which may be obtained by a systematic and persevering attention to the habits of the artizans.'

The population of the township of Hyde increased *ninefold* between 1801 and 1831!

We have not yet completed the circuit of this remarkable district. Following the course of the Mersey from Stayley Bridge and its neighbourhood, we soon arrive at Stockport, a town which at the present day ranks, after Manchester, as high perhaps as any other in the district in the extent of its factory arrangements. Being situated on the southern bank of the Mersey, the town itself is in Cheshire, but its factories have gradually extended to the Lancashire side. Like all the other towns, it has intimate communication with Manchester by railway, the Manchester and Birmingham Railway passing through the town; while the Sheffield line places Ashton, Duckinfield, Stayley Bridge, and Hyde within reach of the great cotton metropolis. An incident came under our own notice at Stockport, which as it illustrates one of the features in the factory system we will mention. A factory, built many years ago, on the plan then in vogue, was enlarged at a later period to meet the extended business of the proprietor; but the new portion was built on the fire-proof plan of modern factories, that is, having very little wood in its construction. The old portion of the building caught fire on the occasion alluded to, and was utterly destroyed; while the new portion, contiguous to it, and filled with machinery moved by the same steam-engine, escaped almost entirely unhurt. The poor workpeople, standing on the opposite bank of the river, were witnessing the wreck which would infallibly throw half of them out of work for a time; and they had the best of all possible grounds for appreciating the new mode in which these large buildings are now constructed.

South-west of Stockport there are some large factories here and there, and also northward of the Mersey through Eccles towards Bolton; but we need not stop to mention these more particularly, after the details already given. Suffice it to say that all the towns which we have mentioned lie within about ten miles of Manchester, on every side, and form, with it, one great workshop for cotton goods. We also find the whole of this district chequered over with the lowly dwellings of the hand-loom weavers, those hard-working men who are competing with the steam-engine in the business of working up the spun yarn into woven fabrics. The clack of the hand-loom is to be heard on many a road-side in the district. We do not, when speaking of cotton factories and weavers within a certain distance of Manchester, mean to imply that they are limited to this district: far from it; the remaining parts of Lancashire and of Cheshire, together with Yorkshire and Derbyshire, and especially the Glasgow district of Scotland, present a very considerable extent of cotton manufacture; but it is within the limits which we have chosen that the wonderful effects of the manufacture are most observable.

When we speak of a 'cotton factory,' it means in most cases a factory for *spinning cotton-yarn*, afterwards to be used by the weaver, the stocking-maker, or the bobbin-net maker; but sometimes, and especially in the modern factories, *power-loom weaving* is combined with spinning, that is, the same steam-engines which work the spinning-machinery also work the looms which weave the yarn into cotton cloth. Hence the factories are distinguished as 'spinning' or 'weaving' or 'spinning and weaving' factories. But it does not follow that *all* kinds of cotton-cloth are either spun or woven in the same factory. In fact it is very far otherwise; each manufacturer confining his operations, generally to a small number of different kinds. The varieties of woven cottons are very large; but so far as regards a slight glance at the principles of the manufacture, all these varieties may be put out of view; and we may consider *spinning* and *weaving* as the two staple objects of the ten or twelve hundred cotton-factories which engirdle Manchester. If then we can glance at the interior arrangement of any one large factory wherein spinning and weaving are both carried on, we shall be able to form something like a judgment of them all. Many such are to be found, both in Manchester and in the towns by which it is surrounded; and it matters little where we make our choice, for the manufacturers of the district generally are liberally disposed to permit strangers to view the operations. We will give our description with reference to Mr. Orrell's factory in the neighbourhood of Stockport, as being one of those which exhibit all the most important improvements in the engineering and mechanical arrangements of factories.

Stockport is itself in Cheshire, but the factory under notice, being on the north side of the river Mersey, is in Lancashire; and we must therefore rank it among the Lancashire factories. The intercourse now between Manchester and Stockport is mainly carried on per railway, and is very extensive; Manchester being as much the mart for Stockport cottons, as for those of Ashton, Oldham, or Bolton. The railway conveys us to the immediate vicinity of the factory, which we approach under one of the arches of the lofty viaduct over the Mersey. When we came within sight of the factory, its arrangement cannot appear otherwise than striking to a stranger; for the lofty chimney is separated from the factory itself by a public road, and stands isolated on a kind of rocky mount. Being a well-formed structure, this chimney (which but for the smoke, looks more like an honorary column than anything else) presents a fine appearance. The furnaces, which supply heat to the boilers for four large steam engines, are situated in a building at one end of the factory; and the smoke from these furnaces passes through a flue under the public road, into the chimney, which thus conveys it up into the atmosphere at a distance from the factory.

When we come in front of the factory itself, we find it speckled over with windows to an enormous amount.

The building extends, from end to end, nearly three hundred feet, having a centre and two projecting wings. There are six ranges of windows in height, each range giving light to one floor or story of workshops. There are nearly a hundred windows in each of these ranges, on the four sides of the building, so that the whole amount to not much fewer than six hundred. The perfect regularity with which the windows of modern factories are arranged, constitutes one of their most conspicuous features. The ground-floor is two hundred feet in depth from front to back, but the upper floors are much less than this.

Withinside the building, the extraordinary scene and deafening noise presented by the operations conducted on the ground-floor are well calculated to bewilder a stranger: but of these more anon; we will at present confine our attention to the upper floors. There are staircases conveniently situated for gaining access to the various floors; but besides this there is a very ingenious arrangement for mounting to any floor without the least exertion on the part of the person ascending. There is a kind of square well; open from top to bottom of the factory, and measuring a few feet square. We place ourselves on a platform within this space, and by pulling a rope, place the platform in connection with certain moving machinery, by which it is carried up, supporting its load—animate or inanimate—safely. When we desire it to stop, on the level of any one of the floors, we have only to let go the rope, and the platform will stop. When we wish to descend, we pull another rope, which enables the machinery to give a reverse movement to the platform.

When, having ascended either by this piece of mechanism or by the staircase, we reach any of the upper floors, we find them to consist of very long rooms, lighted on all sides by windows, and filled with machinery so complicated and extensive that we may well wonder how all can receive their movement from steam-engines in a remote part of the building. Yet such is the case. There are two engines for the spinning-machinery, of eighty horse-power each; and two for the weaving-machinery, of forty horse-power each. These splendid engines are supplied from six boilers, the fires for which consume more than twenty tons of coal per day; and the main shaft from each engine is so connected with other shafts, both vertical and horizontal, as to convey motive-power to every floor, and to every machine in every floor.

Let us next see what are the most distinctive features in these processes of manufacture, and how each one is dependent on the others. The unprecedented train of inventions by which the present state of the manufacture was brought about, and the beauty and intricacy of the machinery by which it is effected, are subjects for a volume, rather than for half a dozen pages, and have indeed formed the subjects of volumes by Dr. Ure, Mr. Baines, Mr. Guest, and other writers. But the broad principles of the operations by which the contents of a cotton-pod are converted into woven calico or muslin, may perhaps be made clear.

In the first place, then, we have to ask what this remarkable substance is. It is a downy substance contained in the pod of the cotton-tree, a plant cultivated extensively in India, America, and other countries. When the pods begin to open, women and children go through the plantations, and pluck the cotton and seeds, leaving the husks behind. The cotton and seeds thus gathered, are exposed to the action of the sun till quite dry, and are then passed through a machine called a 'gin,' by which the seeds are separated from the fibres of cotton. The cotton is not further prepared in the land of its growth, but is packed very tightly in bags, and in that state imported into England, the bags containing somewhere about three hundred pounds each on an average.

When these bags of cotton arrive at Liverpool, they are placed in warehouses; and cotton-brokers then negotiate dealings between the merchants of Liverpool and the manufacturers of Manchester and its vicinity; consequent on which the cotton is forwarded by railway or canal to the towns where it is to be manufactured.

We will suppose bags of cotton, such as those above alluded to, to have arrived at the factory which is the object of our notice. They are classified according to their qualities, to suit the different kinds of yarn spun from them; and after being opened, the cotton is removed, preparatory to the manufacture. Although the fibres of cotton form very light locks or tufts when they have been cleaned from the seeds abroad, yet they are so powerfully pressed when being made up into packages, that the tufts get matted and entangled, and require opening before anything else can be done; because, in all the subsequent operations, each fibre must be combined, unbroken, with others, to form the collected group or thread. This opening of the matted cotton is effected by a large and powerful machine called a *willow*. This machine consists of an inner framework, capable of revolving with very great rapidity, and enclosed in an outer case. Upon the four edges of the inner frame are fixed a series of iron pins or pegs, which in their rotation pass between other similar pins fixed to the inner surface of the outer case. Now if a quantity of cotton be put in the receptacle between the inner and outer frames, and the inner one be made to rotate, it is not difficult to conceive what will follow. The clotted locks of cotton, tossed about within the machine, are caught by the various iron pins, and torn open fibre by fibre. All the dirt and other impurities which may have been mixed with the cotton are at the same time separated from it, and made to fall through a kind of grating into another receptacle. Various forms of the willow, or 'devil,' as it is sometimes called, are used; but all act on the principle of separating the fibres by revolving spikes, the revolutions amounting to five or six hundred in a minute.

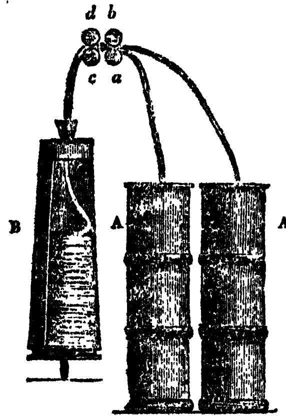
The fibres are thus nearly separated one from another, and nearly cleansed from dust, but not quite; and therefore the next process is to complete the opening and cleansing thus begun. This process is called 'scutching,' or 'batting,' or 'blowing' (for all three terms seem to be in use), and is effected in various ways, but generally by some such arrangement as the following:—The cotton is laid upon a kind of endless apron, which by its movement conveys its burden to a fitting spot, where flat bars, carried rapidly round, strike the cotton violently as it exudes from between two rollers, and thus separates the fibres most thoroughly. There is also a particular kind of fan or vane, so arranged as to produce a most powerful draught, by which all the dirt and dust are carried up and conveyed away—not only out of the machine, but out of the room, and out of the factory itself; for so admirable are the arrangements of a modern factory, that the room in which a very dusty process is carried on is as free from floating dust as any part of the building.

The cotton is now in the form of a very clean, light, downy substance, consisting of short fibres thoroughly disentangled. But these fibres are not *parallel;* they lie across each other at every imaginable angle, and any attempt to combine them together in this state would be fruitless: they must be rendered parallel, and to effect this is the object of the beautiful operation of *carding*, one of those which have exercised such a large amount of inventive ingenuity. If we were to take two combs, and pass the teeth of one between

those of the other, we should have a rude idea of the process of carding, especially if we had a few fibres of cotton entangled among the teeth; for the movement of the two combs would tend to arrange the fibres in some degree parallel. A number of pieces of wire are inserted in a piece of wood or leather, so that all shall project to an equal distance and at an equal angle; and if two such pieces of apparatus were placed with their wires in contact, and moved in contrary directions, a few fibres of cotton placed on the lower one would be *combed out* by the upper one, and arranged parallel. In various stages of the history of the manufacture, the two cards have been arranged in different ways. Sometimes one was on a convex surface, and the other on a concave surface fitted to it: sometimes one was on a cylinder, and the other on a flat surface: sometimes both were on the surfaces of cylinders. But the principle of action is the same in all, and is nothing more nor less than a process of combing. In some arrangements the cotton is brought into the form of a 'lap,' or flat layer, by the scutching-machine, and in that state transferred to the carding-engine; while in other cases the latter is fed by hand with cotton.

The cotton leaves the carding-engine in the state of a delicate, flat, narrow strip or riband, called a *sliver;* and these slivers have now to be converted into *drawings* by being elongated, narrowed, and thinned to a still more delicate condition. This process is one to which Arkwright paid particular attention, as having an important influence on the quality of the spun cotton. In the first place the slivers are collected in tall cans, generally either four or six in number, on one side of the 'drawing-frame,' and are from thence carried upwards to two pair of rollers, the two rollers of each pair revolving in contact. Here all the slivers or cardings are collected into one group, and are drawn between the rollers by the rotation of the latter. Now if these rollers all revolved equally fast, the cotton would leave them with the same united thickness as when it entered; but the last pair revolve quicker than the first, so as to draw out the cotton into a more attenuated riband; because the more slowly-revolving rollers do not supply the material fast enough for the maintenance of the original thickness. This is perhaps the most important principle in the whole range of the cotton manufacture; for it is exhibited alike in the present process and in the next two which follow. All the four or six slivers are connected into one before being caught between the rollers; and after leaving the rollers, the united 'drawing' passes through a kind of trumpet-shaped funnel, and thence conducted into a tall can, round the interior of which it coils itself. One consequence of the drawing-process, if properly conducted, is that the drawing is perfectly equal in thickness in every part, and formed of parallel fibres; and in order to ensure this, the drawing is repeated more than once, each narrow riband being 'doubled' with others before each successive drawing.

The slender ribands thus produced next pass through the 'roving-machine,' where they are brought to the state of *rovings.* In many respects the process of roving is similar to that of drawing, inasmuch as it draws out the cotton to a state of still greater attenuation; but as the cotton, in its now reduced thickness, has scarcely cohesive strength enough to make the fibres hold together, the roving has a slight twist given to it, by which it is converted into a loose kind of thread or spongy cord. A remarkable degree of ingenuity has been shown in the invention of machines to effect this double operation. In the 'can-roving frame,' contrived by Arkwright, here sketched, the cardings, coming from two cans, A A, and passing between the pairs of rollers, *a b* and *c d*, become elongated, and fall into the can B, which by its rotation lays the



roving in a coil, and at the same time twists it slightly. This was followed by the 'Jack-roving frame,' in which the revolving can contained a bobbin whereon the roving was wound as fast as made. Next succeeded the 'bobbin-and-fly frame,' which, from the time of Arkwright to the present day, has undergone a greater number of improvements than most other machines in the cotton manufacture. This consists of a system of vertical spindles, on each of which is placed a reel or bobbin, and also a kind of fork called a 'fly,' still farther removed than the bobbin from the axis of the spindle. The drawing or delicate sliver of cotton is first drawn through or between rollers, and elongated to the state of a roving; then this roving passes down a tube in one prong of the fork or fly, and becomes twisted by the revolution of the fly round the bobbin, while at the same time the twisted roving becomes wound with great regularity upon the bobbin. The machine in fact performs three different and distinct operations: it first attenuates the 'drawing' to a state of still greater thinness and delicacy than it had before; it then gives to the 'roving' thus produced a slight twist, sufficient to enable the fibres to cohere; and lastly, it winds this twisted roving upon a bobbin, on which it is conveniently transferred to the spinning-machine. There is a variety of the apparatus employed in this process called the 'tube-roving frame,' which produces a much larger quantity of roving in a given time than the 'bobbin-and-fly frame;' but the roving produced is inferior, and only fitted for certain purposes.

We then come to the *spinning* process, that which has given a name to the whole series, and to the factories in which the whole are conducted. Indeed when we consider that this is the process which finally presents the cotton in a state fit for the weaver, and that all the others are preparatory to it, we may reasonably deem it the most important in the manufacture. Hargreaves' spinning-jenny, Arkwright's spinning-frame, and Crompton's mule-machine were all constructed expressly for the process of spinning. If we bear in mind the true nature of the process of spinning, we shall see that all the beautiful machines which have been invented within the last hundred years for the spinning of cotton are merely different contrivances for effecting these two objects, viz., the elongating of the roving till it contain in thickness exactly as many fibres as are necessary to produce the required size of yarns, and the twisting of these fibres into a compact thread.

James Hargreaves, in 1764, made such a notable improvement in the spinning-wheel, that he could spin

many threads at once, instead of a single thread upon the old plan. It is said that on one occasion a spinning-wheel happening to be overturned, Hargreaves observed that both the wheel and the spindle continued to revolve for a considerable period; and he conceived the idea of moving several spindles at once with one wheel. He contrived a frame, in one part of which he placed eight rovings in a row, and in another part a row of eight spindles. The rovings, when extended to the spindles, passed between a clasp which opened and shut, and thus loosened or held them. A certain length of roving being extended from the spindles to the clasp, the clasp was closed, and was then drawn along to a considerable distance from the spindles, by which the threads were lengthened and attenuated. This was done with the spinner's left hand, while the right hand turned a wheel which caused the spindles to revolve rapidly, and thus the roving was spun into yarn. By a further adjustment the yarn was wound on the spindle.

This was one of the great and notable applications of mechanism to spinning, and Arkwright's spinning or 'water-twist' frame was another. The name 'water-twist' arose from the circumstance that, whereas Hargreaves' machine was worked by hand, Arkwright's was worked by a water-wheel; and hence the yarn or twist which he produced was called '*water*-twist.' The principle of this machine bears much more resemblance to the 'bobbin-and-fly' frame than to the 'spinning-jenny.' The roving or loose cord, after it leaves the bobbin on which it is wound, passes between rollers whose velocity of rotation is regulated so as to elongate the roving; and the thinner roving thus produced is then twisted into yarn or thread by the revolution of a fork or fly round the spindle on to which the thread is wound. The horizontal rotation of the bobbins, combined with the vertical rotation of the fly, gives the twist.

At a later period Crompton made a peculiar modification of the 'spinning-jenny' and the 'water-twist frame,' so as to produce a kind of a combination of both, which he called a 'mule-jenny'—one among the many odd appellations which have been given to the machines in the cotton manufacture. It was found that though Arkwright's machine could produce strong yarn for the warp or long threads of cloth, it could not produce fine and delicate yarns; and Crompton sought to contrive a machine which should obviate this defect. Like the 'water-frame,' the 'mule-jenny' has a system of rollers to reduce the roving; and like the 'spinning-jenny,' it has spindles without bobbins to give the twist, and the thread is stretched and spun at the same time by the spindles after the rollers have ceased to give out the roving. The spindles in the mule travel to and fro in a carriage, whereas in both the former machines the spindles were fixed in position. The elongation was performed first partially by rollers, on Arkwright's principle, and then finished by the stretching action of a moveable carriage on Hargreaves' principle, and it was found that a finer and more delicate yarn could thus be produced.

The details above given will render us better understood when we say that in modern cotton-factories the spinning-machines partake generally of the character either of Arkwright's or of Crompton's machines. The roller principle, modified in a manner which is represented by the *throstle*-machine, is that by which the strong and hard yarns are produced; while the moveable carriage of Hargreaves and Crompton, made automatic in the *self-acting mule* of Mr. Roberts, is the arrangement adopted for spinning the finer yarns. Some factories are fitted up only for throstle-spinning; others for mule-spinning: and these two terms have now got into such general use, as to imply at once what kind of machines are used—whether those for the stronger or those for the finer work; whether those which work by rollers and the bobbin-and-fly, or those which work by the travelling carriage; whether those for which Arkwright is to have the greater honour, or those for which honour is due to Crompton. Some factories, again, have both throstles and mules; and such is the case in the establishment whose interior arrangement we have described. Two or three of the ranges are entirely fitted up with mule-frames, whose appearance is very remarkable. There is a carriage which draws out five or six feet, bringing with it a large number of threads or yarns, which are stretched by this action, and at the same time are twisted by the revolution of the spindles to which they are attached. In the common mules this carriage is moved by the left hand of the spinner, but in the self-acting mule it is moved by machinery.

The yarn, produced by these two classes of machines, is appropriated to various purposes according to its fineness, strength, hardness, smoothness, and other qualities. Some is employed as *warp* or long threads for coarse goods; some for *weft* or cross-threads; some for printing-calicoes; some for fine muslins; some for cotton hosiery; some for bobbin-net; some for sewing-cotton. The owner of the spinning-factory either works up the yarn into woven goods or sells it to others, according to the nature of the business which he carries on; or he may perhaps combine both methods, by spinning all the yarn for one particular kind of goods which he weaves in the same building, and also spinning other kinds of yarn which he sells to other persons.

At the factory under our notice there are the enormous number of *thirteen hundred* power-looms, all employed in making one kind of cotton goods, of which there is an astonishing quantity produced every week. Wherever the weaving process is carried on, there are always many intermediate steps to be pursued after the spinning is completed; such as 'dressing,' 'beaming,' 'winding,' 'warping,' &c. At this factory these processes are conducted in the upper floors of the building. The dressing is a process by which either melted size or flour-paste is applied to the yarn, as a means of rendering it smooth and stiff. We had occasion to speak of the action of the admirable modern 'dressing-machines,' while describing the operations of a Sail-Cloth Factory, some months back, and may here therefore merely remark that the threads of yarn, spread out in a parallel layer, after dipping into a trough of paste, are brushed by two reciprocating brushes, by which the paste is laid smoothly over the surface, and are then dried by passing over steam-heated cylinders or boxes. It was estimated ten years ago that there were 80,000 power-looms in Great Britain; that each power-loom required three pounds of flour weekly for the dressing of the yarn which it wove; and hence that there were 44,562 loads of flour consumed annually for this purpose only, valued at nearly 100,000*l*. This is one of those minor circumstances which tend quite as much as those of more obvious importance to show the gigantic extent of this manufacture.

Besides the dressing, there are several curious machines employed to prepare the yarn for the loom; by arranging the threads in a parallel layer, winding them on the warp-beam or roller of the loom, passing them through the 'harness' or loops and strings of the loom, and so on. Many of these operations are nearly alike in all the textile manufactures, whether of cotton, wool, linen, or silk.

When we descend from the upper rooms of the factory to the ground-floor, where the weaving takes place, the appearance is certainly more astonishing than anything else presented in the factory. Thirteen hundred looms, each one a distinct and complete piece of

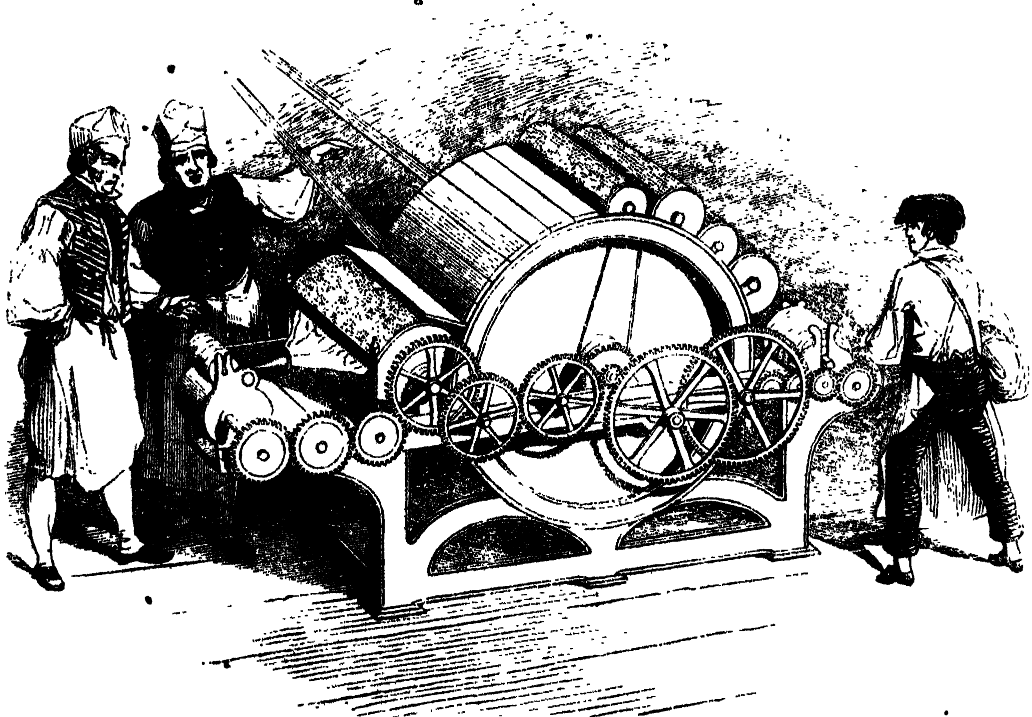
mechanism, are here arranged in parallel rows, over a space of ground measuring probably two hundred and fifty feet by one hundred and fifty; having passages between the rows. Each loom is between three and four feet high, and perhaps five or six wide; and they are all so placed that one female can attend to two looms. Every loom receives its moving-power from mechanism near the ceiling, where shafts and wheels present almost as complex an assemblage as the looms beneath them. These shafts are connected with the main-shafts of the two smaller steam-engines, so as to receive their moving-power from thence.

In order to understand how this immense room is lighted, we must state that only half of it is under or in the main building itself: the other half extends to a great distance in the rear, having no other rooms over. A series of arches, in the wall of the main building, open a communication between the two halves of the weaving-room, so that numerous passages lead from one to the other. In the hinder half the roof is intersected at regular distances with skylights, running from end to end, and placed at such an angle as will throw down the light conveniently upon the looms below. At regular intervals openings can be made in the roof, as a means of ventilation, according to the temperature below.

Six hundred and fifty females are here engaged in attending the looms, two to each, and these comprise almost the only occupants of the weaving-room. The noise created by thirteen hundred machines, each consisting of a great number of distinct moving parts, and each producing what would in an ordinary-sized shop be considered a pretty vigorous din, is so stunning and confounding, that a stranger finds it almost utterly impossible to hear a person speak to him, even close at his elbow, or even to hear himself speak: he walks along the avenues which separate the rows of looms, and arrives one after another at looms all exactly alike; he sees these clattering, hard-working machines on all sides of him, with the heads of the six hundred and fifty females just visible above them; and he may not unreasonably marvel that the persons, exposed to this incessant uproar for ten or twelve hours a day, can appear indifferent to it. Yet such is the case; habit smooths away the inconvenience, and the workpeople seem to think light of it.

In these power-looms steam-power may be said to do everything. It unwinds the warp from the warp-beam; it lifts and depresses the treddles, by which the warp-threads are placed in the proper positions for receiving the weft-threads; it throws the shuttle from side to side, carrying the weft-thread with it; it moves the batten or lay by which the weft-thread is driven up close; and finally, it winds the woven cotton on the cloth-beam which is to receive it. The female who has to manage a pair of looms has merely to attend to a few minor adjustments, which altogether about occupy her time; such as mending one of the threads which may have been broken, removing an empty shuttle and replacing it with a full one, removing an empty warp-beam, or a filled cloth-beam, and replacing them with others fitted for continuing the process.

When the cloth has left the loom, whatever be its quality, it has to undergo certain finishing processes. In some cases it is drawn between heated rollers, which impart to it a smoothness and gloss; in other cases, such as are instanced by velvets and fustians, a nap or pile is raised by a very remarkable series of operations; while other varieties require a yet different mode of procedure.



[Carding-Engine and Factory Operatives.]



[*a*, Oared Shrew—Sorex remifer. *b*, Water Shrew—Sorex fodiens. *c*, Common Shrew—Sorex araneus.]

BRITISH SHREWS.

By many persons these singular little animals are looked upon as "kinds of mice;" they see them mouse-like in size and general aspect, and common as our true mice, not having a definite idea of their real characteristics, and therefore, using the term *mouse* very indefinitely, they call these Shrews *mice*, when in truth there is no affinity between them. Mice belong to the rodent order, viz. that including the squirrel, the hare, the rabbit, the guinea-pig, the porcupine, and the beaver. The Shrews, on the contrary, belong to the insectivorous order, that order which comprehends the hedgehog and the mole. The dentition, which is eminently in accordance with the appetite of these animals, consists of two incisors in each jaw: the upper ones are curved and notched at the base; the lower ones are elongated and almost horizontal, the upper edge being in some species serrated. These are followed on each side by three, four, or five false molars above, and two below. The true molars are four on each side above, and three below. Their surface is acutely tuberculated. Some naturalists regard the false molars as lateral incisors.

The shrews are little plantigrade animals, covered by close, short, soft, and silky fur; the ears are small; the snout singularly elongated, tapering to a point, and moveable, and furnished with long whiskers; the eyes are very small; the tail is rather long, and in many species, when adult, quadrangular, as in the Common Shrew of our island. Along the sides are situated small glandular orifices, whence exudes, at particular seasons of the year, a strong musky humour, rendering their flesh unpalatable to the cat, which kills and leaves them. These orifices are surrounded by stiff close hairs. In certain foreign shrews, as the Sorex Indicus, the odour is exceedingly powerful. The Common Shrew, Sorex araneus of Bell and most British writers, is not the S. araneus of continental naturalists, but the Sorex tetragonurus. This is the opinion of Mr. Jenyns, and it agrees with our own personal observations of an extensive series of specimens in the Paris Museum.

This little animal is very common, but very timid and shy; it frequents sunny banks covered with grass and other vegetation, brakes and copses, and its feeble chirring cry may be often heard, the animal remaining concealed. We may here observe that we have known persons whose ears were incapable of catching this shrill and very peculiar note; their auditory nerves seemed to be insensible of it, or the tympanum of the ear failed to receive or respond to the atmospheric vibration.

The shrew feeds upon insects and their larvæ, together with worms, and in quest of which it grubs with its long flexible snout in the earth, using it both as a borer and a feeler. According to Pennant, the shrew inhabits old walls, heaps of stones, hayricks, manure beds; it also tenants holes in the ground, and burrows in banks and among the roots of trees. The female breeds in the spring, producing from five to seven young ones at a birth; for these she prepares a snug nest of grass and soft dry herbage, artfully concealed in any hole or fissure her instinct may lead her to select, generally in a tufted bank or among tangled vegetation. The nest, which is covered over at the top,

has an orifice at the side for her entrance and exit Like all the smaller animals, which rapidly multiply their species and bring forth a numerous progeny, the shrew has many enemies and though the cat will not eat it, hawks and owls are by no means so fastidious, and numbers fall a prey to these rapacious birds, to weasels stoats and even the mole· besides, as we have often observed, there seems to be, from some unexplained cause, a periodical mortality among these animals this occurs in August or the beginning of September at which season numbers are found dead in fields and along road sides, without exhibiting any external injury, at least in many instances, in several cases, however, which have come under our own notice the animal appeared to have been killed, though the skin was not lacerated All the insectivora are impatient of hunger, requiring a continual supply of food, they die under a short fast. This constitutional peculiarity is exemplified in the mole, and equally so in the shrew. This voracity is accompanied by great pugnacity of disposition, which leads them to attack each other, the weaker usually falling a victim to his stronger adversary Mr Bell says that if two shrews be placed together in a box, a very short time only elapses before they commence fighting, the victor not only killing, but feasting on the vanquished This ferocity is exhibited also by the mole but not as far as we are aware, by the hedgehog Like the latter animal, the shrew was formerly an object of popular superstition Even Aristotle declares its bite to be dangerous to horses and other beasts of burden and more especially so if the shrew be a female with young, boils ensuing, which, if the bite be given by the female in question, break into ulcers Pliny affirms that in Italy the bite of the shrew is poisonous Agricola continues the story, stating that the shrew is called *mus araneus* by the Latins, because it injects venom from its bite like a spider (*Aranea* • He describes the form of the animal's incisor teeth and of the wound they make In warm climates, he says the bite is generally pestiferous, but not so in cold climates, and he recommends as a remedy that the animal be cut asunder and applied to the wound Cuvier observes that in France it is accused of causing a malady in horses by its bite—a false imputation and it would appear that a small tumour in the thigh of the horse, often accompanied by severe symptoms, is called musaraigne or musette, the French names of the shrew In our own country the bite of a shrew was (and in some districts is still) believed to be venomous to cattle, nay, that it paralyzed or produced dreadful pain by merely running over an animal's foot Bingley says, "When a horse in the fields happened to be suddenly seized with anything like a numbness in his legs, he was immediately judged by the old persons to be planet-struck or shrew struck The mode of cure which they prescribed, and which they considered in all cases as infallible, was to drag the animal through a piece of bramble that grew at both ends" This, however, was not the only mode of cure White, in his 'History of Selborne,' says, 'At the south corner of the Plestor,* or area near the church, there stood, about twenty years ago, a very old grotesque hollow pollard ash which for ages had been looked upon with no small veneration as a shrew-ash Now a shrew-ash is an ash whose twigs or branches, when gently applied to the limbs of cattle, will immediately relieve the pains which a beast suffers from the running of a shrew-mouse over the part, for it is supposed that a shrew-mouse is of so baneful and deleterious a nature, that wherever it creeps over a beast, be it horse, cow or sheep, the suffering animal is afflicted with cruel anguish, and threatened with the loss of the use of the limb. Against this accident, to which they were continually liable, our forefathers always kept a shrew ash at hand, which, when once medicated, would keep its virtue for ever A shrew ash was made thus —Into the body of the tree a deep hole was bored with an auger, and a poor devoted shrew-mouse was thrust in alive and plugged in, no doubt with several quaint incantations long since forgotten' This shrew-ash on the Plestor was destroyed by orders of the clergyman

"The late vicar stubb'd and burnt it,'

when he was way-warden, regardless of the remonstrances of the bystanders, who interceded in vain for its preservation, urging its power and efficacy, and alleging that it had been—

"Religione patrum multos servata per annos'

The Common Shrew measures about two inches and three-quarters in the length of the head and body, that of the tail being one inch ten lines The colour is reddish-brown above, greyish beneath the tints vary in intensity in different individuals The Water Shrew is a distinct species from the Common Shrew differing in habits and manners This species is the *Sorex bicolor* of Shaw, the *Sorex fodiens* of English naturalists, but, as Mr Jenyns asserts not of Duvernoy nor of continental writers generally

It is but recently that naturalists have ascertained the existence of the Water Shrew in our island, yet in certain districts it is by no means uncommon, and in some places was popularly considered to be a small sort of mole, from its velvety fur its burrowing habits, its pointed snout and its minute eyes and ears Though often found at some distance from the water this little animal may be regarded as aquatic in its habits and is well formed for swimming, the hind feet are broad and the sides of the toes are furnished with rows of fine bristles, each row constituting a sort of fringe serving the purpose of a web A fringe of long hair runs along the under surface of the tail rendering it more effective as a rudder The Water Shrew swims and dives in pursuit of its prey with admirable ease and address, but it is so shy, and its hearing is so acute, that it is not to be observed without some precaution The first detailed account of the manners of this animal from personal observation was by Mr Dovaston and published in Loudon's 'Magazine' vol ii p 21 He notices that it swims rather superficially with the belly flattened, the sides as it were, spread out and the tail extended as a rudder The motion of the hinder feet is alternate, but it makes its way with great velocity, and dives instantaneously its thick velvety coat becoming beautifully silvered by the innumerable bubbles of air that cover it when submerged

These shrews live for the most part in the banks of rivulets and spring-water ditches, and appear to collect their food, which probably consists of the larvæ of the ephemeral flies, from among the loose mud If cautiously watched, they may be seen crouching at the mouths of their holes, looking intently on the water Should a shoal of minnows or sticklebacks pass near, the shrew plunges amongst them, but seldom succeeds in making a capture, and, retiring to his station looks out for another chance When pursued by the weasel, they drop into the water, and pass to the other side These Water-Shrews are evidently gregarious in their habits, and are very lively and sportive they feed on aquatic insects, and on such as are accidentally drowned, they root amidst the leaves and mud with their long noses, in search of food, with great earnestness and perseverance, or pursue their insect prey in the water, as the otter gives chase to fish, and with the same determination They dwell in extensive shallow burrows, excavated in the bank sides The female breeds in spring, producing from five to seven young

* Or Pleystow—locus ludorum—a play-place.

at a birth. Their note is a short, shrill, feeble sibilation.

In the 'Magazine of Natural History' for March, 1840, is an interesting account of the Water-Shrew, by Dr. Barnard Clarke:—"Whilst walking," he says, "by the side of the river Gipping, in May, 1838, between Ipswich and the village of Sproughton, my attention was arrested by several water-shrews actively engaged in a dyke that runs parallel to the river. These little creatures were in such rapid motion on the water, that its surface was thrown into a state of quick undulation, though the dyke was at least four feet wide. At times they would be upon the surface, moving at a rapid rate between the blades of the aquatic plants, consisting principally of *Sparganium ramosum* and *simplex*, that grew from the bottom. Then they would dive, and for a while remain beneath; but always, on returning to the top, displaying the greatest rapidity in their movements. Whilst above water, they were constantly repeating their faint though shrill tremulous squeak, which appeared as though expressive of pleasurable sensations. On visiting the spot the following evening, and secreting myself, I had the opportunity of remarking the movements of these little animals on land. I found beneath a slightly hanging bank, and close by the water-side, a long gallery, which, though in a great measure naturally formed, yet had been much laboured at by the shrews to render it a convenient viaduct between one hunting-place and another: the grasses and other plants had been removed, as well as here and there small portions of earth, in order to render this passage, in their movements from end to end, as commodious as possible. I observed the shrews continually passing backwards and forwards through this passage, which enabled them to travel with facility from one part of the ditch to another, and which was principally a little above the water-level, but at intervals there were depressions at which the water passes on to or over its floor. This passage was evidently the common property of many shrews, as several were continually running backwards and forwards along its whole extent, and ultimately taking to the water, swimming up and down the ditch, diving, and performing various evolutions in search of their insect prey. They swim upon or under the surface of the water with equal rapidity, and when beneath, the hair upon their bodies so completely repels the water, that the air entangled in the fur gives to the bodies of these little animals the brilliancy of silver as they pursue their course. On emerging from the water, the coat appears perfectly dry, but this is further insured by the little creature giving itself a sudden shake on arriving at its landing-place. I remarked that in travelling along the above-mentioned gallery, the tremulous shriek is always heard when two shrews happen to pass each other, and the same thing occurs, though not so invariably, in their movements in the water. When a shrew secured an insect, it quitted the water, and ascended a convenient stone, or the projecting root of a tree, a clod of earth, or some similar body, where at leisure it devoured its prize, steadying the insect with its fore-paws, while it nibbled it with the greatest enjoyment. I once traced a pair of shrews into a small hole in a bank by the side of a ditch, where I had been in the habit of observing them; and in order to try and secure them, I carefully removed the earth, when I found that, although the entrance was scarcely larger than just to allow of two shrews passing together, it led into a very capacious vestibule, with galleries leading one into another, and so extensive that there was no possibility of ascertaining their full extent without removing the greater portion of the bank."

The Water-Shrew is three inches three lines in length, exclusive of the tail, which is two inches one line. The colour of all the upper parts is a rich brownish black, the under parts being nearly pure white, with an abrupt line of demarcation between the two colours.

A species termed the Oared Shrew (*Sorex ciliatus*, Sowerby; *Sorex remifer*, Geoffroy) is by most naturalists regarded as distinct, though allied to the Water-Shrew, which it appears to resemble in habits. According to Mr. Yarrell ('Zoological Proceedings,' 1832) the Oared Shrew is distinguishable from the more common Water-Shrew by its greater size and uniform colour, the whole of the upper part of the head, the body, and sides are velvet black; the situation of the ear is marked by a tuft of white hairs, more conspicuous than in the Water-Shrew from the greater contrast of colour. There is a small patch of light brown under the lower jaw; the under-surface of the body is rusty black, and the tail is black with a line of pendent greyish-white hairs along its under surface. Dr. Scougal of Glasgow states that the Oared Shrew is not uncommon in the neighbourhood of that city, and three specimens were recognised by Dr. Hooker as similar in every respect to the Water-Shrew which he had procured in Norfolk. But then, was not this Water-Shrew the S. bicolor or fodiens? In the 'Annals of Natural History' for June, 1841, the Reverend Mr. Jenyns observes, "I have seen so many intermediate specimens between this (the Oared Shrew) and the Water-Shrew, that I consider it extremely doubtful whether they be distinct." And he leaves the point as one requiring to be more fully investigated by anatomical comparisons.

Mr. Bell gives the measurement of the Oared Shrew as three inches two lines for the length of the head and body for the tail, two inches one line.

It would appear that other species of Shrew, besides those we have described, are indigenous in our island. Of these, one, which is common in Ireland, is termed by Mr. Jenyns, Sorex Hibernicus: to this he had previously applied the title of rusticus, having found it in England, while he regarded the Irish Shrew as distinct; but since they have been proved to be the same, he requests "that the name of Hibernicus be hereafter adopted for this species, which, though not confined to Ireland, seems to be the common species in that country, and is much more abundant there than in England, where it gives place in a great measure to the S. tetragonurus. It has been observed in different localities in Ireland, and one specimen, sent me by Mr. Thompson, was stated to have been taken in the county of Antrim, at an elevation of 1200 feet above the level of the sea."—'Ann. and Mag. Zoology,' &c. June 1841, p. 263.

Another species is described by Mr. Jenyns as the Chestnut Shrew (Sorex castaneus), of a bright rufous colour: it is closely allied to the Common Shrew, and may perhaps be only a variety.

The number of foreign shrews is very great, but in habits and manners they resemble those of the British Islands, their destined work being to thin, in conjunction with other insectivora, the innumerable hosts of insects and small "creeping things" which teem upon the surface of the earth. Was it from this cause that the shrew was among the consecrated animals of the ancient Egyptians? For, strange to say, the mummies of two distinct species have been, after the lapse of so many centuries, discovered in a good state of preservation in the crypts of Thebes and Memphis. Of these, one is the Sorex giganteus of Isidore Geoffroy, the "Grande Musaraigne" of Geoffroy, in the 'Catalogue raisonné de M. Passalaqua' (Olivier, 'Voyage en Egypte'). The other is a species of small size, termed by M. Isidore Geoffroy, Sorex religiosus. Of this no fewer than twenty well preserved specimens exist in

the collection of Egyptian antiquities at Paris, belonging to M. Passalaqua. Of this species we have met with no detailed description, nor are we aware that its living prototype is ascertained. From the divine honours paid to it by the superstitious Egyptians, it has received the appellation religiosus. The Shrew, called by the Greeks Mygale, was, as we are informed by ancient authors, especially worshipped in the Athribitic home (or district) of Egypt, and that it was sacred to, and considered as the mundane representation of Latona. The supposed blindness of this animal is alleged to have been the cause of its dedication to one of the deities of darkness and concealment.

LOCOMOTION OF ANIMALS.—No II

In our last article it was stated that muscles are the *active* organs of motion in animals; that they are endowed with great power;—and we pointed out the means by which their power is estimated If we select four animals of the same order, having similar figures, whose dimensions of one kind are as 1, 2, 3, 4, the weights of the animals and of all their corresponding parts will be as the cubes of these numbers, that is, as 1, 8, 27, 64; but since it is found that the force of a muscle depends on the number of its fibres, this force must increase in the ratio of its transverse section, that is, as the square of one of the dimensions of the animal, or as 1, 4, 9, 16. The contractile force of the muscles in a healthy man, according to Dr Young, is equivalent to about five hundred pounds for each square inch of the surface presented by their transverse sections We may then easily understand from the preceding remarks why it is that the most powerful men have their muscles most developed, and why the largest muscles are placed in those parts of the body where they are subjected to the greatest quantity of work For example, the force of the muscles that close the lower jaw in man is estimated at five hundred pounds, indeed the force of these muscles is well known to be sufficient to crush the soundest teeth when a hard substance is placed between them Some individuals are capable of holding between the teeth and of supporting by the lower jaw two hundred and forty pounds and upwards In many of the lower animals, such as the carnivora, the muscles which close the lower jaw are much stronger and more developed than in man, as is exemplified in the ease with which the lion and tiger lacerate their prey

Some idea of the power of the muscles which unite the limbs to the trunk may be derived from the attempts that have been made to tear the limbs of men from their bodies during life. It is related by Dr. Hodgkin, in his 'Lectures on the Preservation of Health,' that during the reign of Louis XIV. a man was condemned to be torn to pieces by horses; his arms were accordingly tied to one horse, and his legs to another, but the combined efforts of both were insufficient to effect the purpose designed, and the executioner was compelled to *cut* the muscles through before the limbs of the wretched victim could be torn from the body. These illustrations will suffice to establish the great force with which muscles are endowed during life It is well known that the quantity of labour which the muscles will endure, and the length of time they will continue to act, increase, within certain limits, in proportion to their daily exercise. If the muscles of the arms or legs, or any others, be called suddenly into action for a longer period than that to which they have been accustomed, they soon communicate to the individual a sense of weariness, and evince a disposition to yield to the action opposed to them, and, unless they are allowed some repose, mischief speedily succeeds. But when their action is very gradually increased day after day, it is observed that the bulk of the muscles, and consequently their power, is augmented. For it has been already stated that the force of muscles is directly proportioned to the square of the surfaces which they present on making transverse sections through them: and if we take the estimate of Dr. Young for the basis of a computation of the additional force they acquire by exercise, we shall find that an increase of a quarter of a square inch in a single muscle is equivalent to a gain in strength of $\frac{500}{4}$ or one hundred and twenty-five pounds Now as a great number of muscles act at the same time in moving the limbs, it follows that they must all become enlarged, in proportion as they contribute to produce that motion. It is therefore practicable, by gradually increasing the exercise of the different muscles of the body daily, and thereby augmenting their bulk, to attain a vast increase of animal strength, and when we consider that health is the result of such exercise, if it is not carried too far, no stronger argument can be adduced for its adoption. But there is a limit to the amount of exertion which the muscular system will bear: if that limit is passed, the muscles lose their vigour, and lassitude and a flaccid state supervene Experiment teaches us how long the muscles may be continued in action, and the quantity of force which they are capable of expending during that period We have before stated that the weight of the body is proportional to the cube, and the power of the muscles to the square, of some one of its dimensions for instance, in two similar-formed men, whose heights are respectively five and six feet, the muscular power of the former to that of the latter will be as 25 to 36 but their weights will be as 125 to 216, or as 25 to 43 very nearly, the weight, therefore, increases much more rapidly than the muscular power, and consequently a small man is stronger, in proportion to his size, than a larger one. The same law holds good in all animals of the same kind, of which some striking examples will be given in a subsequent number In persons predisposed to corpulency, and who neglect to use the proper means of checking it the quantity of fat continues to increase and the muscles to decrease in volume until they exhibit the deplorable phenomenon of an inability to move even their own weight without pain and difficulty for it is found on dissection that the quantity of muscular fibre is less, and the fibres themselves more flaccid, in fat persons than in others If then our more opulent neighbours would keep in mind the physical effects of indulgence here described, it might serve as a wholesome check to an inordinate use of the luxuries with which they are surrounded, and induce them, before it is too late, to adopt a regular and sufficient course of muscular exertion It is true, many are prevented by the nature of their sedentary occupations from taking the kind of exercise which others enjoy in the performance of their ordinary business; but then there are many gymnastic and other modes of calling the muscles into a healthy state of action, which persons engaged in the most sedentary employments may resort to during some portion of the day, so that it is in the power of every one to preserve his health so far as can be effected by exercise alone Having thus given a general notion of the organs by which the movements of animals are performed, let us now turn our attention to the manner in which those organs act, and the laws by which they are regulated

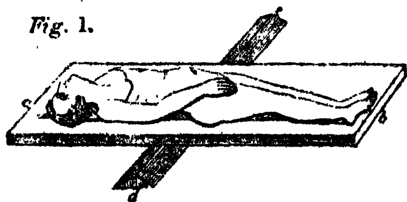
Position of Man in Locomotion.—It is at first sight a matter of no little wonder and speculation how the human figure is maintained in an erect position, supported as it is on such a narrow base as the soles of the feet, and why we do not walk like quadrupeds upon the four extremities, which would afford a large base

of support, bring the centre of gravity nearer the ground, and increase the stability of the whole body. These subjects have engaged the attention of anatomists and zoologists, and have excited no small controversy.

With regard to the power of keeping the body erect, we observe by the numerous trials and falls of children that it can only be acquired by long practice; but still it is purely a mechanical problem. We all know the difficulty of poising a slender cylindrical rod upon one of its ends, and that a very small force directed laterally against it will throw it down.

Now in order that any body with its base resting on the earth may remain stationary, it is necessary that a vertical line drawn through its centre of gravity* should also fall within the base. The centre of gravity of the human body may be thus determined:—Having first balanced a board *a b* (Fig. 1) upon the edge of a

Fig. 1.



triangular prism *d e*, let a line be drawn on the board close to the edge of the prism; let the board be again balanced on the prism in any other position, and another line be drawn as before: then a vertical line passing through the intersection of the two lines drawn on the board will pass through its centre of gravity. Now if a person be laid on the board, as represented in the figure, so that the whole mass of the man and board may balance in the same two positions as the board alone did, the centre of gravity of the man will be somewhere in the intersection of the two vertical planes which pass through the lines drawn on the board; and in order to determine the exact position of this centre, let the person stand erect and balance himself on the board, which must be placed in its original position on the prism: then by means of plumb-lines freely suspended on each side over the line drawn on the board, the vertical plane passing through the centre of gravity is found, and consequently the point where the intersection of the other two planes meets the third plane is the centre of gravity, which is generally found to be a point in the junction of the loins with the pelvis, called the *sacro-lumbar articulation;* but its position varies in different individuals in consequence of the different proportions existing between the weight of the trunk and that of the legs. The attitudes and movements of every animal depend on the position of the centre of gravity and base of support. When a man stands erect, a plumb-line passing through his centre of gravity will fall between his feet. It is a subject of mathematical investigation, when the feet are equally advanced and equally inclined (as in Fig. 2), to determine the angle *a b c*, which they must

Fig. 2.



* The centre of gravity of any body is that point upon which the body, acted on only by the force of gravity, will balance itself in all positions; consequently, if a line or plane which passes through the centre of gravity be supported, the body will be supported in all positions.

form with the prolongation of the line joining the heels in order to afford the greatest base of support. In general, where the legs are perfectly vertical, it will be found that the line joining the centre of the heels is just equal to the length of the foot, and in this case the required angle will be 60° exactly; as the heels approach each other this angle diminishes, and when they are close together it is rather more than 48°. Opera dancers, beside curving the body, employ their arms to bring the centre of gravity over the base of support, which is often limited to the ball of the great toe of one foot, the weight of the raised leg and foot is also concerned in producing the equilibrium of the body in resting on the other foot. Rope-dancers use a long heavy pole for the same purpose: the pole is grasped by both hands, and carried nearly at right angles to the axis of the rope, as the centre of gravity must be continually brought over the very narrow base which the rope affords, and the rope itself, if slackened, having a motion both lateral and vertical, and being at a considerable height above the ground: the process of rope-dancing requires great muscular activity and precision in the attitudes of the body to secure the performer from falling. The celebrated Madame Saqui, as is well known, lost her life by a fall from a rope. The centre of gravity has always a tendency to oscillate on each side of the rope, and the eye of the performer is fixed on one end of it, by which means he is enabled to keep his body steady, and moreover when his centre of gravity falls on the left side of the rope, a sufficient portion of the pole is shifted to the right side in order to restore the equilibrium. A long rod is then a very good auxiliary for keeping the body steady in positions of difficult equilibrium, such as walking over narrow parapets, or wooden bridges thrown across rivulets without a hand-rail, which may often be met with in country districts. When a porter carries a burden, the attitude

Fig. 3.



of the body must accommodate itself to the position of the common centre of gravity of himself and his load. Thus, in the above figures it will be observed that when the man stands upright, the centre of gravity of the man G falls within the base of support, and if his load L falls without the base, as does likewise *g*, the common centre of gravity of the man and load, the consequence would be that he would fall backwards; but this is prevented, or, which is the same thing, the point *g* is brought within the base by the man bending his body forward. The reverse happens when the load is carried in front; as for instance, by the laundress, whose basket is carried in front, as in Fig. 4. In this case, instead of bending forward, as in the former case, the body is thrown back, in order that the centre of gravity common to the woman and the basket may be brought within the base of support. In these and similar cases the person will be prevented from falling



when the line G g multiplied by the weight of the man is equal to the line g T multiplied by the weight of the load. When a person stoops to place a load, such as a pail of water, on the ground, the hips are thrown backward so as to bring the point g within the base of support. Just as the pail reaches the ground the common centre is for a moment, however, beyond the base, and there is great danger of the body falling forwards, which is sometimes prevented by the person instinctively clinging to the edge of the pail. Corpulent persons are observed to walk very erect, in order to throw the centre of gravity immediately over the hip joints upon which the body rotates as in Fig 5.



They are also observed to take very short steps, and walk more slowly than others, the cause of which will be discussed hereafter.

The preceding principles are exceedingly important to the sculptor as well as to the painter, because every new position of one part of the body requires a simultaneous adaptation of all the other parts. We shall next proceed to show that man is properly organized to stand and move as a biped, and not as a quadruped.

BUILDING-STONES.—THE NEW HOUSES OF PARLIAMENT.

The rebuilding of the Houses of Parliament has given rise to an inquiry, more precise than had hitherto been made, into the quality of various kinds of stone as building material, the result of which will probably be valuable in other cases besides that for which it was especially intended.

The circumstances under which the inquiry took place were these:—In the autumn of the year 1838 a commission was appointed by the Crown to inquire into the selection of stone for building the new Houses of Parliament, with a view to the choice of a kind which should possess the largest amount of valuable quality. The commissioners were Sir H. T. De la Beche, the eminent geologist; Mr. Barry, the architect of the new Houses of Parliament; Mr. W. Smith; and Mr. C. H. Smith; and they obtained the assistance of Professor Daniell and Professor Wheatstone, of King's College, in determining the chemical and mechanical qualities of various specimens of stone. During the months of August, September, and October, the commissioners visited numerous quarries in various parts of the country, to inspect the quality of the stone, and to ascertain the available quantity, the price per cubic foot or per ton, the means of conveyance to London, and other particulars of a like kind. They then visited various abbeys, cathedrals, churches, towers, castles, and other public and private buildings, to witness the extent of deterioration which the different kinds of stone seemed to have undergone. As a means of leaving a permanent record of their labours, they caused cubes to be prepared of numerous average specimens of workable stone, and deposited in the Museum of Economic Geology.

In March, 1839, the commissioners presented their report to the office of Woods and Forests. From the following paragraph in their report, it will be seen that *granite* was placed out of the list of stones to which their attention was directed:—"We have not considered it necessary to extend our inquiry to granites, porphyries, and other stones of similar character, on account of the enormous expense of converting them to building purposes in decorated edifices, and from a conviction that an equally durable and in other respects more eligible material could be obtained for the object in view from among the limestones or sandstones of the kingdom. We have nevertheless to acknowledge the receipt of several specimens of granite, among which are some from the estates of the Marquis of Breadalbane near Oban in the west of Scotland, accompanied by a munificent offer on the part of his lordship, that, should the granite from that locality be considered fit and available for the proposed new Houses of Parliament, he would be willing to make a free gift to the nation of his interest in any quantity that might be required for the purpose."

Before stating the result at which the commissioners arrived, we will give a few details concerning the working of granite for building purposes.

However much granite may have been used for bridges and some other engineering purposes, it has not been much used for buildings, on account of its excessive hardness in working. There are, however, cities in which granite forms a conspicuous material of the buildings. In St. Petersburg, for example, not only the imperial and other palaces, but even ordinary dwelling-houses, have their lower part lined with slabs of granite. The left bank of the Neva, from the foundry to the Gulf of Cronstadt, and both banks of the canals, are lined by huge walls constructed of slabs of granite, as are likewise many bridges over the Neva. The pillars, stairs, balconies, &c. in the palace of Cronstadt are in like manner almost all of the finest granite; those blocks or slabs employed for ornamental purposes are cut and polished by lapidaries, but those intended for less delicate purposes, such as for steps, pillars, &c., are worked by peasants.

Granite was used extensively by the Egyptians and other ancient nations for their temples and palaces; and there are instances of a similar kind sparingly seen in most parts of Europe. The grey granite of Chessi, in France, is the material of which the columns of the ancient temple of Augustus near Lyons, are made. From the grey granite of Elba have been formed the four columns taken out of the church which contained the tomb of Charlemagne at Aix-la-Chapelle; afterwards transferred to the Musée Napoleon. The antique green granite is the material of a column in the

Villa Pamphili near Rome. Various modifications of red granite have been used for the statue of Peter the Great at St. Petersburg, for the pedestal of the equestrian statue at Florence, and for various purposes of architecture and sculpture. But still the use of granite may be considered as being very limited.

A few months ago Lieutenant Newbold communicated to the Royal Asiatic Society a very interesting account of the Hindu mode of quarrying and polishing granite. The most usual method of quarrying followed in India is to employ the agency of fire. In this process the granite rock is covered with dry bushes of the various *acacias* common on the plains, which are then fired, and kept burning until quite consumed. The intense heat causes a separation or exfoliation of the granite, to the depth perhaps of twenty-four inches, in the centre of the fire, but gradually thinning towards the edges. The piece thus exfoliated is then detached by driving in small iron wedges at the extremities, and is finally raised by a powerful lever. Sometimes the rock proves more refractory than usual, and then it is customary to pour cold water upon it when hot, or to drop on the surface a heavy boulder of greenstone or granite. When blocks are required for statuary or millstones, or for any other purpose where greater thickness than one or two feet is requisite, another process is followed, similar to that employed by the ancient Egyptians in quarrying the granite of Syene. A great number of holes, an inch square, and of different depths according to the size of the block wanted, are bored in the rock nearly close together, forming a connected chain around the piece to be detached. Each hole is then fitted with an iron wedge, and the whole are simultaneously and unremittingly struck with iron hammers, until their united force overcomes the cohesion of the block. The chisels used in piercing the holes are kept cool by pouring water upon them while working. When long and thinner slabs are required for bridges, pavements, lintels, &c., a third process is employed, combining the principles of the two former. The rock is heated by the first mode, and the separation is completed by driving wedges into a chain of holes, as in the second. Lieutenant Newbold stated that he has seen blocks of eighty feet in length separated in this way. He also observed that the Hindus take advantage of the heat of the sun in promoting the separation of the granite slabs. Sometimes they pour cold water into the clefts made by the wedges, which greatly hastens the separation of the block.

The polish given to Indian granite is very brilliant, as may be seen in many of their temples. Two modes of polishing are adopted. When a flat surface is required, the granite is slightly smoothed and flattened by an iron tool; and it is then rubbed with a large and heavy block of granite, hollowed in its under surface, and having its hollow filled up with *lac* and *corundum*. The mixture adheres strongly to the stone, which is tightly fixed between two rods. The extremities of these rods form the handles for two workmen, who draw the stone backwards and forwards over the block to be polished, occasionally throwing water on the surface to prevent the lac from melting. When the piece to be polished is of a more varied form, as a cornice or moulding, a piece of wood, with the corundum mixture, or even a lump of the mixture alone, is used instead of the granite polisher.

It is not to be wondered at that stone which requires such elaborate processes as these for its preparation should be rejected as a building material in general, nor that the commissioners should have left this kind out of the class of those whose fitness they investigated as a building material for the Houses of Parliament. The principal kinds examined were either *sandstone* or *limestone*, each of which presents very numerous varieties and subvarieties. The commissioners visited considerably more than a hundred quarries, in every part of Britain; and examined a large number of public buildings, whose present condition is briefly noted, under the three headings of "sandstone buildings," "limestone buildings," and "magnesian-limestone buildings," according to the kind of stone employed. Every quarry which they visited is entered in a tabulated statement, in which the particulars concerning the stone to be procured from thence are put under nineteen separate headings, in parallel columns. These particulars are, name of quarry—name of place—name of county—nearest post-town—name and address of freeholder—name and address of freeholder's agent—name and address of quarryman—mineral designation of stone—component parts of stone—colour—weight of stone in its ordinary state per cubic foot—entire depth of workable stone—description of the beds—size of blocks that can be procured—prices of block stone at the quarry per cubic foot—description and cost of the carriage to the Pool of London—cost of stone delivered in London per cubic foot—cost of plain-rubbed work as compared with that upon Portland stone, in London, per superficial foot—and lastly, where known or reported to have been employed.

The above details related to the nature and availability of the stone, as ascertained at the quarry. When the specimens reached the hands of Professors Daniell and Wheatstone, they were subjected to various mechanical and chemical tests, to determine their qualities; and the results were given in two tables, included, like the former one, among the Parliamentary Papers for 1839. In the first of these two tables the result of the examination of sixteen specimens of stone is given, five being sandstone, three limestone, four magnesian-limestone, and four oolite. The chemical analysis of all these varieties is first given, that is, the proportionate weights of silica, carbonate of lime, &c. contained in them. Then their specific gravities; next their absorbent powers when saturated under the exhausted receiver of an air-pump; then the disintegration under atmospheric action; and lastly, their cohesive powers. The second table is much more extensive, and contains the results of the examination of a larger variety of specimens, and under a greater number of tests. All the specimens were in the first instance worked into the form of two-inch cubes, in order to facilitate comparison: and the qualities were tabulated in the following order:—Weight in ordinary state, in grains, when freely exposed to the atmosphere—weight when well dried by exposure to heated air for several days—weight when completely saturated, having been immersed in water for several days—weight of water absorbed (being the difference between the last two results)—bulk of water absorbed, a two-inch cube being reckoned as unity—weight of particles disintegrated—cohesive power, as measured, 1st, by the weight requisite to produce fracture of the stone, and 2nd, by the weight needed to crush it completely by a Bramah press.

It will be seen from the above tables, that the commissioners sought to determine the qualities of the various stones in almost every way in which comparison could be introduced. After examining various buildings, the commissioners, in noticing certain favourable qualities in magnesian-limestone, remark:—"As far as our observations extend, in proportion as the stone employed in magnesian-limestone buildings is crystalline, so does it appear to have resisted the decomposing effects of the atmosphere; a conclusion in accordance with the opinion of Professor Daniell, who has stated to us that, from the result of experiments, he is of opinion that the nearer the magnesian-limestones approach to equivalent proportions of carbonate of lime

and carbonate of magnesia, the more crystalline and better they are in every respect." The commissioners terminated their inquiry by the following recommendation:—"In conclusion, having weighed, to the best of our judgment, the evidence in favour of the various building-stones which have been brought under our consideration, and freely admitting that many sandstones as well as limestones possess very great advantages as building materials, we feel bound to state that for durability, as instanced in Southwell Church, &c., and the results of experiments, as detailed in the accompanying tables; for crystalline character, combined with a close approach to the equivalent proportions of carbonate of lime and carbonate of magnesia; for uniformity of structure; for facility and economy in conversion; and for advantage of colour—the magnesian limestone, or dolomite, of Bolsover Moor and its neighbourhood is in our opinion the most fit and proper material to be employed in the proposed new Houses of Parliament." Of the stone here recommended, about fifty parts in a hundred are carbonate of lime, and forty are carbonate of magnesia, the remaining ten parts being silica, alumina, &c.

Antelope Shooting.—The antelope of this country, I believe to be different from all other known varieties, and it forms one of the most pleasing living ornaments to the western world. They are seen in some places in great numbers, sporting and playing about the hills and dales; and often, in flocks of fifty or a hundred, will follow the boat of the descending voyager, or the travelling caravan, for hours together, keeping off at a safe distance, on the right or left, galloping up and down the hills, snuffing their noses, and stamping their feet, as if they were endeavouring to remind the traveller of the wicked trespass he was making on their own hallowed ground. This little animal seems to be endowed, like many other gentle and sweet-breathing creatures, with an undue share of curiosity, which often leads them to destruction, and the hunter who wishes to entrap them saves himself the trouble of travelling after them. When he has been discovered, he has only to elevate above the tops of the grass his red or yellow handkerchief on the end of his gun-rod, which he sticks in the ground, and to which they are sure to advance, though with great coyness and caution, whilst he lies close, at a little distance, with his rifle in hand; when it is quite an easy matter to make sure of two or three at a shot, which he gets in range of his eye, to be pierced with one bullet. —*Catlin's North American Indians.*

Increasing Consumption of Whale-oil.—It appears worthy of remark, that notwithstanding the large consumption of coal for gas, which has in a great degree superseded the use of oil for street-lighting, the aggregate consumption of whale-oil has very materially increased. This fact is of course referable to the fashion now become very general of burning table-lamps in the place of candles in our dwellings; but it must excite surprise in the mind of every one when first made acquainted with the fact, that during this time the use of candles in dwellings, and especially of wax-candles, has also increased in a greater proportion than the population. It has been suggested, and with much apparent reason, that this increase may be consequent upon the greater brilliancy of the streets since they have been lighted with gas, since we have thus been made dissatisfied with the quantum of light previously thought sufficient within our houses. Certain it is, that our apartments are much more brilliantly lighted now than they were before the introduction of coal-gas, whether that invention be chargeable with the increase or not.—*Porter's Progress of the Nation*, vol. iii. Section v. '*Consumption.*'

New Uses of Iron.—Among the new employments found for iron, must be mentioned ship-building. Iron was first used about the year 1810 for the construction of vessels employed in canal and river navigation. After this, the first similar employment of this material occurred in 1820, when a steam-vessel called the "Aaron Manby" was constructed at the Horsley Iron-works, and made the voyage between the capitals of England and France without unlading any part of her cargo. This vessel is still in good condition, although twenty-two years old, never having required any repairs to her hull. In 1825 a small iron steam-boat was placed on the river Shannon, where she is now employed, in good condition. In 1832, the "Elburkah," an iron steam-vessel, built by Messrs. Macgregor Laird and Co., in Liverpool, made the voyage from that port to the coast of Africa, and twice ascended the river Niger. This successful experiment led to the construction of many other iron steam-vessels. One builder, Mr. John Laird of Birkenhead, near Liverpool, has built forty-five iron vessels, of the aggregate burden of 12,600 tons. The total number launched since 1830 is said to exceed 150. The largest iron vessel yet finished, and in use, is the "Guadaloupe," a steam-frigate of 788 tons, carrying sixty-eight-pounders, and belonging to the Mexican government; but her dimensions are insignificant when compared with those of the "Great Britain," now building, and nearly finished, at Bristol.

The length of this vessel, from her figure-head to the tafrail, is	320 feet
The breadth of beam	51 ,,
The depth of her hold	31 ,,
Her draught of water, when loaded, is calculated to be	16 ,,

and her burden 3500 tons. The engines will have a force equal to that of 1000 horses, and will be used to keep in action, as the means of propulsion, an Archimedean screw. The draught of water will be seen not to exceed that of a first class West Indiaman. At present this vessel can only be considered as an experiment; and should it fail, an abundance of ridicule will no doubt be cast upon the projectors by men whose genius would hardly have sufficed for the invention of a wherry. A great part of the steam navy of the East India Company consists of iron vessels, twenty-five of which are now in use in India, among which are the "Nemesis," the "Phlegethon," the "Ariadne," and the "Medusa,"—names well known to the British public from the conspicuous part which the vessels have performed in the war with China. The advantages of iron over timber, for naval architecture, are—the absence of "wear and tear" in the hull—no necessity for caulking or coppering—no possibility of injury from dry-rot—greater lightness and increased capacity—and, what is of even far more importance, greater safety. This last point has sometimes been questioned, but not by any one having knowledge on the subject. When a timber-built ship takes the ground with any violent shock, the whole frame-work of the vessel is strained, and in a measure dislocated,—so that by the mere buffeting of the waves she will, in all probability, soon be made a complete wreck; but when an iron-built vessel strikes, however violent the blow, it is only the part that is brought into collision with the rocks that will be injured. The plan of building these ships in water-tight compartments then proves its efficacy, for should the injury amount even to the tearing away of plates, the resulting mischief will only be to fill with water that particular compartment of the vessel to which the injury has occurred, so that the ship will be scarcely less buoyant than before; and experience has shown that damage of this kind is easily repaired. The first cost of iron vessels is somewhat, but not much, less than that of timber-built vessels: their comparative cheapness results from their greater durability: after years of constant employment they are found to be as sound and as clean as when first built. Their weight, upon which depends the displacement of water, is—as a general rule—three-fifths the weight of wooden vessels of the same capacity. The weight of metal used in proportion to the burden of the ship varies, of course, with the size. A sea-going iron steam-vessel will take from nine to twelve cwts. of iron per ton register. Boats intended for river traffic, which do not require an equal degree of strength, of course take a less weight of metal. The building of iron ships is fast becoming an important branch of national industry; it is one in which our mineral riches and our great mechanical skill will secure to us a virtual monopoly.—*Porter's Progress of the Nation*, vol. iii. Section v. '*Consumption.*'

Beautiful Provision of Nature.—The capsules of several species of mesembryanthemum refuse to open except when moistened by the rains, lest, opening in a dry season, they should shed their seeds on an unprepared soil.—*Regions of Vegetation* (South Africa), *by R. B. Hinds, in Capt. Belcher's Voyage round the World.*



[Coolies.]

TRIBES AND CASTES OF INDIA.

The Coolies, Kholies, or Coulies are dispersed over a comparatively small tract of country. They occupy the Ghauts, or mountain-passes of western India, as far south as Bombay, and even somewhat farther. Their neighbours to the northward are the Bheels, of whom some account has been already given. They are almost as wild a race, and are distinguished for their predatory habits; yet, when trusted, they are faithful servants, and Bishop Heber states that, in Guzerât, they and the Bheels are uniformly preferred for the service of the police, and as dervâns to gentlemen's houses and gardens. When thus employed they are called sepoys, and with more accuracy, he remarks, than the regular troops to whom the designation is given, "inasmuch as their weapons are still really the bow and arrow, 'sip,' whence the Asiatic soldier derives his appellation." A party of twenty of these Coolie sepoys whom the Bishop met, and who were employed in the service of an English revenue collector, are described as "rather short, but broad-set and muscular men, with a harshness, not to say ferocity, in the countenances of many of them, which remarkably differed from the singularly mild and calm physiognomy usually met with in the other side of India. They were well and smartly dressed in green and scarlet kirtles, with black turbans; every man had his small round buckler and sheaf of arrows at his back, his sword and dagger by his side, and long-bow in his hand, and, excepting in their dusky complexions, were no bad representatives of Robin Hood and his sturdy yeomen." The Coolies affect to be descended from the Rajpoots, but wild and warlike tribes all over India continually make this claim, and, in many instances, without believing themselves that such is their origin. Heber conceives that the fact of their never wearing either the silver badge or the red turban is conclusive evidence that the Coolie caste have no faith in their Rajpoot affinity. In Guzerât, where the Coolies form two-thirds of the population, they are regarded by the superior class of Hindoos as the original inhabitants of the country, though the Bheels have much clearer pretensions to this claim. Heber's suggestion that the Coolies are only more civilized Bheels, is probably not far from the truth. The Coolies, having learned to conform to some of the religious practices of the Hindoo, such as abstinence from meat, are acknowledged by them as their kindred, which the Bheels never are.

As cultivators of the soil, which is the chief occupation of the Coolies, they often display much industry. They live under their own Thekoors, or heads of the village, whose authority is generally willingly acknowledged, but when it suits their interest they pay little respect to the laws, and their turbulent and predatory disposition is only kept in check by an armed force. Hence the British occupation of Guzerât twenty years ago was more expensive than any other part of our Indian empire. The civil servants of the government were obliged to reside in the towns for protection, and the roads were at all times insecure in consequence of foraging and plundering excursions. These lawless bands displayed great activity and courage, and showed far less wanton cruelty in their treatment of prisoners than other tribes who were as constantly engaged in acts of rapine. The costume of a party of Coolie sepoys has already been described, and the following is Heber's account of the appearance and dress of the general population:—"They are hardy, stout men, particularly those of the Catteywâr and Cutch districts. Their usual dress is a petticoat round the waist, like that of the Bheels, and a cotton cloth wrapped round their head and shoulders, which, when they wish to be smart, they gather up into a very large

white turban. In cold weather, or when drest, they add a quilted cotton kirtle, or 'lebada,' over which they wear a shirt of mail, with vant-braces and gauntlets, and never consider themselves as fit to go abroad without a sword, buckler, and bow and arrows, to which their horsemen add a long spear and battle-axe. The cotton lebada is generally stained and iron-moulded by the mail-shirt, and, as might be expected, these marks, being tokens of their martial occupation, are reckoned honourable, insomuch that their young warriors often counterfeit them with oil or soot, and do their best to get rid, as soon as possible, of the burgher-like whiteness of a new dress. This is said to be the real origin of the story told by Hamilton, that the Coolies despise and revile all cleanly and decent clothing as base and effeminate. In other respects they are fond of finery: their shields are often very handsome, with silver bosses, and composed of rhinoceros-hide; their battle-axes richly inlaid, and their spears surrounded with many successive rings of silver. Their bows are like those of the Bheels, but stronger and in better order; and their arrows are carried in a quiver of red and embroidered leather. In their marauding expeditions they often use great secrecy, collecting in the night at the will of some popular chieftain, communicated generally by the circulation of a certain token, known only to those concerned, like the fiery cross of the Scottish Highlanders. They frequently leave their families in complete ignorance as to where or why they are going; and the only way in which, should one of their number fall in battle, the survivors communicate his loss to his widow or parents, is by throwing before his door some sprigs of the peepul, plucked and disposed in a particular form."

It will be thought that these Coolies do not seem very well calculated for the continuous labour of the sugar-plantations in the Mauritius or for any other regular employment; but 'Coolie' is a name given all over India to the bearers of burdens, and the Coolie emigrants are not natives of any province in particular, but are labourers who have often come to the cities and towns from a variety of districts. Many castes have an invincible and superstitious abhorrence to the idea of a voyage by sea; and it is on the whole fortunate when a slight breach even is made in a prejudice at once barbarous, narrow-minded, and effeminate. Under proper regulations, which it is the duty of the government to provide, and this duty they have not neglected, the emigration of Coolies to the settlements in the eastern hemisphere, at all events, will be attended with many advantages. Lord Auckland, when governor-general of India, wrote a minute on the subject, in which he said:—"Could a number of voluntary and industrious adventurers annually leave India for countries where labour is more highly paid, and could nearly the same number annually return, with an average capital of from one hundred to two hundred rupees (10*l.* to 20*l.*), with some acquirements in cultivation and manufactures, and with his wits sharpened by experience, I think that such a course would have an excellent effect upon the country (India), and be a source of general advantage." India is not the rich and wealthy country which many deem. Large masses of its peasantry are worse off than the Irish in the least fortunate districts of the sister kingdom. Poverty and distress often visit the natives of India in their most appalling forms; and those who have the boldness to emigrate can save in a few years only, by their industry, a larger sum than could be obtained during a long life spent at home even under very favourable circumstances. The advantages of emigration have never been presented to the natives of India, and therefore the effect of such an opening upon the native character in encouraging an adventurous spirit, cannot as yet be clearly indicated. In 1839, in consequence of abuses, which should have been rendered impossible by careful regulations, the emigration of the natives of India was prohibited, under the plea that a new slave-trade in disguise might spring up. Careful provisions for regulating emigration and protecting emigrants having been adopted, the prohibition has been wisely revoked. The prospective advantages of this regulated and systematic emigration from India are not so grand and striking as those which may be expected to flow from the free intercourse just now commenced for the supply of labour between Africa and the West Indies—for the civilization of India and Africa are widely different; but, as Lord Auckland remarked, the Indian emigration will have "an excellent effect upon the country."

PROGRESSES OF QUEEN ELIZABETH.
No. VIII.
1575.

THE great feature of this year's progresses was the Queen's visit to Kenilworth Castle, so well known from Sir Walter Scott's excellent novel, and also from Laneham's minute though fantastical description, and of which we have in previous volumes given an account, together with views of the Castle.* But though the chief, it was not the only noticeable visit of the year. Early in the season the Queen, attended by her "most honourable Privy Council and other her lords and nobility," visited the famous astrologer, Dr. Dee, at Mortlake, in order to see his library, which seems to have been a large one, containing by his own account four thousand books and manuscripts, with chemical and other apparatus. His wife, however, had been buried only a few hours preceding their arrival, and the Queen refused to enter the house; "but wished me," says the doctor, in his own very curious account of himself, "to fetch my glass so famous, and to show unto her some of the properties, which I did. Her Majesty being taken down from her horse by the Earl of Leicester, master of the horse, at the church-wall of Mortlake, did see some of the properties of that glass, to her Majesty's great contentment and delight, and so in most singular manner did thank me." It is difficult to imagine the strong-minded Elizabeth believing in the extravagant fancies and hallucinations of the old astrologer; yet, as she certainly patronised him, it has been suspected that she employed him occasionally in procuring intelligence from less remote, though, perhaps, more dangerous regions than those he professed to be most intimate with— that she used him, in fact, as a spy. Yet, though she might not place implicit faith in his magic glass, and might use the learned and widely-travelled scholar for more practical purposes than incantations, she was most likely not wholly exempt from the common credulity of her age, which very generally assented to the belief in astral influences. Burleigh—the wise and worldly Burleigh— it is known, himself calculated the Queen's nativity; and we are, therefore, not surprised at Dee's statement that he was sent for to Windsor in great haste, in 1577, on the appearance of a comet, which had occasioned a general alarm in the court, and that he spent three days in tranquillizing the mind of the Queen and her courtiers by giving a favourable interpretation to the appearance of the wandering stranger. He also held consultations with her physician about "her Majesty's grievous pangs and pains, by reason of tooth-ache and the rheum," in which probably his chemical knowledge was more efficacious than his astrology. Elizabeth

* See 'Penny Magazine,' No. 59, No. 213 (this contains the notice of the Queen's visit), and No. 661.

made him warden of Manchester College in 1595 when he was sick she sent her own physicians to attend him, "sent him divers rarities to eat, and the honourable Lady Sidney to attend on him, and comfort him with divers speeches from her Majesty pithy and gracious" He died in 1608, after a life of wandering and adventure, at Mortlake, and was buried in its churchyard

Early in May she twice visited the sick-bed of Catherine, Countess of Pembroke, by whom she had been received "with all due humility" at Wilton in the preceding year The countess was lying at Baynard Castle, and a letter of Lady Talbot's thus records the visits —"The Queen's Majesty hath been here with her twice very late both times The last time it was ten of the clock at night or ever her Majesty went hence, being so great a mist, as there were divers of the barges and boats that waited of her lost their ways and landed in wrong places, but thanks be to God her Majesty came well home without cold or fear'

On the 24th of May her Majesty was at Theobalds, and in July she set off on her progress to the Princely Pleasures of Kenilworth The corporation of Leicester had made great preparations for her entertainment on her way, ordering 'that every householder forthwith amend and beautify the fore-front of their houses, and amend the pavement" These proceedings almost remind us of the progresses of the empress Catherine of Russia through her dominions when it is stated Count Orloff absolutely caused towns to be built and gardens planted merely for her to pass through, being dismantled immediately afterwards The citizens of Leicester, however were disappointed, as she went to Kenilworth by Northamptonshire, her retinue being lodged at Warwick She arrived at Kenilworth on the 9th of July and remained nineteen days

From Kenilworth Elizabeth removed to Lichfield where she stayed eight days, attending divine service in the cathedral, and making occasional visits in the neighbourhood Among the entries of expenses incurred at this period we find, to my Lord Warwick's players, 8s 8d,' and given to the Queen's bearward in reward, 3s 4d From Lichfield she proceeded to Chartley Castle then the seat of Walter Devereux earl of Essex, now of Earl Ferrers Thence to Stafford Castle, the residence of Edward Lord Stafford, to Chillington, the seat of John Giffard, Esq, and on the 12th of August to Hartlebury, the seat of the Bishop of Worcester, making her entry into that city on the following day

Her coming had been carefully prepared for at a 'convocation and common council holden on the 16th of July, it was ordered that 'the four gates shall be set in some decent colour, viz an ash-colour, with her Majesty's arms both within and without,' that "every person having dunghills or miskyns and timber within the liberties shall cause the same to be carried away within ten days next, and so shall keep clean their soils, and pave the same with all convenient speed' [this was better than the covering of them over, as ordered at Sandwich], that "Mr Bailiffs, Mr Aldermen, and the High Chamberlain," should meet her on horseback with their maces the "twenty-four others that hath been bailiffs in scarlet gowns faced with black satin, with doublets of satin, on foot, and the other, the residue of them, in murrey in grain, and the forty-eight in their livery gowns of velvet in grain, fair and comely, with the rest of the freemen and every occupation by himself in their gowns and other decent apparel,' that "the livery-gowns of every company of the chamber be viewed by Mr Bailiffs and their brethren, and to be comely and decent," that "a fair cup be bought in London for the presenting the gift to the Queen's Majesty, and 40*l*. in sovereigns, and angels of her own coin and stamp [had these also to be bought in London?], and, not the least important that "21*l* be levied towards the charges in receiving the Queen's Majesty," while the deputy of the Recorder was to be "spoken with touching the oration, and to be rewarded for his pains" The reception took place accordingly, the oration was spoken and graciously acknowledged, the cup was presented, and received with hearty thanks, a pageant was prepared at the Grass Cross, with "three boys uttering very good and delectable matter in their speeches,' to which her Majesty gave "very attentive ear she then went to St Helen's church, where was another pageant, and more speeches, with which she was also much pleased, having "so good liking of the matter as (being foul and rainy weather) she called for her cloak and hat, and tarried to the end" Thence she went to the cathedral where in the porch one of the scholars made her a speech in Latin which done, she on her knees heard service and made her prayers, then receiving a purse of crimson velvet wrought with gold, having 20*l* of gold in it, she entered the church, "with great and solemn singing and music," and examined the tombs of King John and of her uncle Prince Arthur, returning at length to the Bishop's palace

On Sunday, the 14th, she "was disposed to ride in her coach or wagon to the cathedral church to hear service and sermon' the people, "innumerable in the streets and churchyard crying "God save your Majesty to which she replied rising in her coach and showing herself at each side, "I thank you I thank you all'

She remained here till the 20th of August visiting places in the neighbourhood occasionally Thus on the 15th she rode to Hindlip a place which became more celebrated in the succeeding reign in connection with the Gunpowder Plot On the 18th she rode "on her palfrey' to Hallow Park 'and being on Hinwick Hill she viewing Pitchcroft and all the field adjoining the city, and the commons there and turning her palfrey marvelled to see such a number of horses together whereunto it was answered by her footmen and other citizens being present that it was a common ground and kept several for her Majesty's horses and of her retinue and train for the which she gave the city great thanks During which time of her Majesty's abode here there were pastured, by credible reports, above fifteen hundred horses and geldings without paying anything therefor' This curious fact gives us a clearer idea of the pomp of these progresses, while it increases our wonder how accommodation could be provided The means of reception were of course previously ascertained and much inconvenience was no doubt submitted to while servants and followers slept in outhouses and stables, as they could contrive best for themselves, but in all this there must have been much discomfort In Hallow Park the Queen hunted, killing one buck with her bow and wounding another so that it was taken, which bucks she directed to be given to the two bailiffs On Friday, the 19th, she went to Batenhall Park to hunt but 'for that she found the game very scarce she returned again without hunting at all" The following day, at three in the afternoon, she took her leave with much ceremony, being waited upon by the corporation and inhabitants, and after reciprocal leave taking speeches, she departed with tears in her eyes and the people with a loud cry said "God save your Majesty"

She passed the night and the following Sunday at Elmley Bredon, and after entering Gloucestershire she visited Sudeley Castle We have then no record of her movements till the 11th of September, when she was received at Woodstock with the Hermit's Tale, by George Gascoigne, and an oration by Master Laurence

Humphrey. The Hermit's Tale consists of a series of allegorical emblems, which are expounded by the hermit in long-winded prose speeches in English, Latin, Italian, and French: the oration of Master Humphrey is in Latin, but introduced by two or three Latin poems. From Woodstock she went to Reading, attending divine service at St. Lawrence Church, where a seat was specially fitted up for her, the pulpit hung with a new cloth, and the church strewed with flowers. The remainder of the year was spent at Windsor, Greenwich, and Hampton Court, her Christmas being kept at the last-named place.



[Penshurst. General View.]

RAMBLES FROM RAILWAYS.

PENSHURST (*continued*).

THAT juxta-position of Mansion and Church so common on our old baronial estates was at once calculated to feed and to chasten the pride of those who could look back over a long line of ancestors who had each in his period trod the wide and lofty halls of the one in the pomp and power of lordly state, or in the more real dignity of intellectual pre-eminence or of conscious worth, but who had, also, each at last been fain to put up with the lowest and narrowest of cells in the other. What such men spring from, and what they must pass to, is ever before their eyes, invested with all those associations which most effectually prevent indifference or forgetfulness; and could we trace the operation of these influences through the lives and characters of many of the memorable personages of our history, the result would doubtless be as striking as the study would be full of interest. In this house of the Sidneys, towards which we are now advancing from the churchyard, how often have the youthful eyes of the future poet or patriot kindled at the recollection of the men who had eaten and drunk, smiled and sighed, toiled in thought, been excited by ambition—elevated in success or depressed in despair, beneath these same walls that now covered them! Here had lived the Duke of Bedford, Regent of France during the minority of Henry VI., whom Rapin describes as "the most accomplished prince in Europe: wise, judicious, of great valour, solidity, and penetration, master of his passions, and of a genius superior to all employed by him; he seemed born for a throne, though Providence had ranked him among subjects;" and of whom is told the delightful story by the same author, concerning his tomb in France, where he died of mortification and anxiety, on account of the treaty between Charles VII. and the Duke of Burgundy, a treaty fatal to the English interests on the Continent:—"Louis XI., son of Charles VII., being one day in the church at Rouen, and looking upon the Duke of Bedford's tomb, a certain lord of his retinue advised him to demolish that standing monument of the dishonour of the French. 'No,' replied the king, 'let the ashes of a prince rest in peace, who, were he alive, would make the boldest of us tremble. I rather wish a more stately monument were raised to his honour!'" Then again, after Bedford's decease, Penshurst belonged to his brother, the "good Duke Humphrey" of Shakspere, and the great literary patron of his day. It need not excite surprise that the recollections of such men attaching to a locality, seem often to have a powerful tendency to raise them up fitting successors—the seed needs but a generous soil—and lo! we have a Philip or an Algernon Sidney. In the centre of the north and principal front of Penshurst an inscription on the entrance tower explains to us how the estate came into the possession of the family who have made it so famous. "The most religious and renowned Prince Edward, the sixth king of England, France, and Ireland, gave this house of Pencester, with the manors, lands, and appurtenances thereunto belonging, unto his trusty and well-beloved servant Sir William Sidney, knight banneret, serving him from the time of his birth unto his coronation in the offices of chamberlain and steward of his household: in commemoration of which most worthy and famous king, Sir Henry Sidney,

knight of the most noble order of the Garter, Lord President of the Council established in the Marches of Wales, son and heir of the aforenamed Sir William, caused this tower to be builded, and that most excellent prince's arms to be erected anno Domini 1585." The Sir Henry here mentioned, who was also favoured by Edward VI., enjoyed no less the esteem and confidence of his successors, Mary and Elizabeth; the last of whom made him Lord Deputy of Ireland, where his admirable government won him the especial commendations of such writers as Edmund Spenser and Sir John Davies, in their respective works on that country. But the most satisfactory and agreeable evidence to us of Sir Henry's character is his son's love for him, and his own well-known appreciation of that son, before the Christian heroism of the fatal field of Zutphen, or the lofty eloquence and sparkling fancies of the 'Defence of Poesy' and the 'Arcadia,' had stamped the world's favourite with a character beyond even that world's highest previous judgment of him. The exterior of this front of the mansion, which presents a long and handsome façade of Tudor windows, and battlemented walls, turrets, and towers, relieved in various parts by projections, has been lately restored, or rather is still in process of restoration, for the whole is not yet completed, though the works were begun early in the present century. The other principal front, facing the west, is also very long, and still more picturesque in its effect from the variety of its details. Over the central portion, with its large triple-arched windows, is seen the lofty gable of the hall, and at each end is a wing, with towers of different heights, size, and shape, tall highly-decorated chimneys, and sloping roofs. Passing through the chief entrance, the doorway of the tower with the inscription before mentioned, we step across a court to the Banqueting Hall, perhaps the most perfect piece of antiquity of the kind in England. Its date is supposed to be that of the reign of Edward III.; five centuries therefore have passed over it, and yet its lofty walls and pointed windows and timber-arched roof, its screen below and gallery above at one end and dais at the other, its oaken tables along the sides, and massive andirons—that primitive grate—in the centre, are still existing, and ask but for the careful and liberal hand to re-assume also their pristine strength, beauty, and character, through the restoration to the windows of their elegant tracery, to the roof of its fine corbel figures, fortunately still preserved, and to the walls, some of those suitable decorations which we may be sure once made them rich, as hangings or pictures, emblems of the battle and of the chace. Yes, there is one other and most indispensable thing to be done, and that is to tear down the perspective view painted all over the walls of the farthest (or dais) end; a production that must have issued from the taste of the last century. And all these things we have good reason to hope and believe will be done; and we shall once more see the hall as it was when Ben Jonson sat here an honoured guest of those

> "——— whose liberal board doth flow
> With all that hospitality doth know,
> Where comes no guest but is allowed to eat
> Without his fear, and of thy lord's own meat.
> Where the same beer, and bread, and self-same wine
> That is his lordship's, shall be also mine.
> And I not fain to sit (as some this day)
> At great men's tables, and yet dine away.
> Here no man tells my cups; nor standing by
> A waiter doth my gluttony envy:
> But gives me what I call, and lets me eat;
> He knows below he shall find plenty of meat.
> Thy tables hoard not up for the next day;
> Nor when I take my lodging need I pray
> For fire, or light, or livery; all is there
> As if thou then wert mine."

Or when the poet stood by to behold that delightful custom of the old time, the tenants all

> "——— come in, the farmer and the clown,
> And no one empty handed, to salute
> Thy lord and lady, though they have no suit.
> Some bring a capon, some a rural cake,
> Some nuts, some apples; some that think they make
> The better cheeses, bring 'hem; or else send
> By their ripe daughters, whom they would commend
> This way to husbands, and whose baskets bear
> An emblem of themselves in plum or pear."

Or lastly, when Jonson beheld in another custom, so touchingly beautiful, the cause of much of the personal character of the Sidneys living and dead:

> "They are and have been taught religion; thence
> Their gentler spirits have suck'd innocence:
> Each morn, and even, they are taught to pray
> *With the whole household.*"

From the Hall, doors lead off in several different directions: one to the court-yard, where is the bell, the gift of the Earl of Leicester (Sir Philip's uncle), 1649; another from the music gallery to the suite of apartments occupied by Waller's Saccharissa; a third from the dais on the right to the private apartments; and a fourth on the left, opposite, by an elegant winding staircase, to the rooms which are generally exhibited. The interest of these apartments centres entirely in their contents, to which accordingly our notice will be confined. In the first of the range, the ball-room, some memorials of Elizabeth's visit here form the chief objects of curiosity. The antique-looking chandeliers suspended from the ceiling and the alabaster plates on the table are understood to have been gifts to Sir Henry Sidney. In the same room there is a curious painting of a group of birds, attributed to the Earl of Leicester; four very large paintings on the wall, by Vanderborcht, having respectively for their subjects the Triumph of Cupid, Venus rising from the Sea, Europa on the Bull, and Cupid trying his Bow; with, lastly, some portraits of a very miscellaneous character, but including some by Vandyke and Lely. Next to the ball-room is the Page's, just such a little ante-room as the name suggests: this contains works of a much higher character. We have here one of Rembrandt's finest productions in his generally finest because most perfect class—portraiture, and which is directly interesting from its being the artist's own portrait: also a St. Hubert by Titian. On a painting of flowers we read the name of M. A. Caravaggio, and the colouring reminds us of Annibale Caracci's striking eulogium on the purity and vigour of the tints in some of Caravaggio's more ambitious pictures, that he "ground flesh" rather than colour. The Fall of Phaëton, by Julio Romano; a very interesting full-length of a youth, the son of Charles II. and Nell Gwynn, and first Duke of St. Alban's; and many other portraits also adorn the walls of the Page's room. On one of the tables is a bridle, richly mounted with gilt metal, once the property of George Villiers, Duke of Buckingham, and on another a sword of remarkable shape: the handle is probably sixteen inches long, the cross-piece represents a ragged staff, with bears at the extremities, and from each side of the blade, a little way above the handle, projects a kind of short spike: that is the sword of Sir Philip Sidney. The next of the suite of apartments is still more directly devoted to the preservation of the recollections of Elizabeth's visit; it is called her drawing-room, and is still in the same state as when she furnished it with those stately-looking chairs and low couch, with their yellow and crimson satin draperies. She also wrought their embroideries with her own and her attendants'

hands; or such at least is the story told here, and it carries with it more probability than these stories usually do. The sovereign who could value one of her subjects so highly as to forbid his joining in a dangerous expedition, from the fear of losing "the jewel of her dominions," as Elizabeth did when Sir Philip was about to accompany Drake in his expedition against the Spaniards in the West Indies, may easily be supposed to have thus [illegible] that subject's family. The pictures in the [illegible] rooms include a Dutch Pleasure-fair by Wouvermans, and a Charity by Guido, one of those subjects in which this fine painter is so pre-eminent. But the portraits here engross one's attention. Before we have cast many glances round the walls, our eyes rest on the lineaments of Sir Philip himself; and when they wander for a moment from them, it is but to be attracted by those of "Sidney's sister, Pembroke's mother," the subject of Jonson's inimitable epitaph; or by those of Algernon Sidney, with a view of the Tower in the background, and the memorable words beneath, "Beheaded December 7th, 1683." This portrait is the more valuable and interesting from the circumstance that it was evidently taken just before Sidney's execution. And truly the shadow of the approaching death seems upon it; the expression of the face is at the same time firm, unyielding, and, we could fancy, unwontedly stern, as though in defiance of the gaunt conqueror. Sidney, we need hardly mention, was arrested by the government at the same time as his friend Lord William Russell, immediately after the announcement of the Rye House Plot, and committed to the Tower on a charge of treason. He was tried by the infamous Judge Jefferies, who on this occasion awed perhaps by his knowledge of the high intellect and indomitable character of the prisoner, kept his ordinary brutalities in something like check: perhaps too his very anxiety to destroy so dangerous a man to the existing government as Sidney was known to be, had a powerful tendency towards the same end. The French minister Barillon, in a letter written only three years before, seems to have described Sidney's principles and motives with great precision: he speaks of him as "a man of great views and very high designs, which tend to the establishment of a republic. He is in the party of the Independents and other sectaries; and this party were masters during the last troubles." This too was the same man who, according to the testimony of Bishop Burnet, had studied the history of government in all its branches beyond any man he had ever known; and who has left us such an evidence of his power to teach what he had learnt to others as his 'Discourses on Government.' Finally, his courage was equal to his lofty views, his learning, and his intellect: during the reign of Charles I. he had fought in the Parliamentary ranks, and afterwards sat as one of the judges on the great trial; he had braved Cromwell during the Protectorate; he had defended the king's execution, whilst in exile in consequence of the Restoration, and when, by so doing, he must have been well aware how he was still further closing against himself the path towards home. Such a man to such a government was indeed eminently dangerous; and the latter expressed their opinion to that effect, by a determination to overleap every barrier that law, justice, or humanity might interpose between them and him. Two witnesses were necessary to prove the charge of treason. Lord Howard of Escrick, a confederate in the plot according to his own confession, and whom the prudent Evelyn calls a "monster of a man," was prepared to save his own life by becoming one of these witnesses; but no second was forthcoming. What was to be done? A manuscript had been found among Sidney's papers, appearing to be written, says Evelyn, before the Restoration, and, if so, pardoned by the Act of Oblivion, which contained an avowal of principles similar to those which it was alleged were involved in the Rye-House Plot; that manuscript it was determined should be the second witness. It is idle to speak of his being found guilty when tried by men who could do these things, or of his death being afterwards determined upon in the face of the universal horror and disgust. He was executed, as the inscription here states, on the 7th of December; and if we could forget all the records of his previous life, his death alone would be sufficient to stamp him as the patriot. He appealed in no way to the sympathies of the people in whose cause he suffered; but when asked to speak, said he had made his peace with God, and had nothing to say to man. He handed a paper however to the sheriff (which was afterwards printed), containing a distinct and final avowal of his views: the paper concluded with the prayer, "Grant that I may die glorifying thee for all thy mercies, and that at the last thou hast permitted me to be singled out as a witness of thy truth; and even by the confession of my very opposers, for that old cause, in which I was from my youth engaged, and for which thou hast often and wonderfully declared thyself." Such was the man whom writers of the most opposite political views have agreed to honour. The poet expresses but the solemnly confirmed decision of posterity on this second of the two men that have made Penshurst illustrious, when he says,

> "[illegible]
> [illegible]
> [illegible] Sidney, Russell [illegible]
> [illegible] who call'd Milton friend [illegible]
> [illegible]
> [illegible]"
>
> [illegible]



[Earl of Leicester's Bell, [illegible]]

BRICKS AND BRICK MAKING.

The material with which the chief buildings in any particular country are constructed depends, in a much greater degree than we are apt generally to suppose, on the geological character of the country itself. If stone quarries be abundant and easily worked, stone becomes a chief building material; in a chalky district the whiteness of various kinds of buildings, chiefly however of the humbler sort, indicates the extensive use of chalk; while a clayey district, such as the 'London clay' on which the metropolis is built, furnishes an exhaustless store for the manufacture of bricks as a building material. These remarks are applicable not only to our own country and our own

times, but to all countries and to every age. Thus, if we seek to ascertain why ancient Babylon presented such remarkable specimens of brick-work, while Persepolis, Palmyra, Carnac, Thebes, and other ancient cities display ruins of stone instead of brick, we shall probably find a solution in the circumstance that Babylon occupied a site on a low flat, clayey district, near the banks of the great rivers Tigris and Euphrates, where the materials for making bricks were furnished in great abundance.

The making of bricks is one of the mechanical arts mentioned very early in the Scripture history. The book of Genesis informs us that burnt bricks were used in the construction of the tower of Babel, which, according to the usually received chronology, was erected within four centuries after the Deluge. In other countries in early times the bricks do not seem to have been burned. The ruins of the tower near Bagdad are found to be formed of unburnt bricks. When the Israelites were in bondage in Egypt, one of the tasks imposed on them was the making of bricks, and these bricks it has been supposed were sun dried, but not burned or fired. Some of the brick buildings of India, whatever be the period at which they were erected, seem to have been formed of bricks not only fired but formed with a skill which has never been surpassed and rarely equalled. Thus Dr Kennedy in his 'Campaign of the Indus' remarks:—'Nothing I have ever seen has at all equalled the perfection of the early brick-making which is shown in the bricks to be found in these ruins, ancient tombs near [illegible], the most beautiful chiselled stone could not surpass the sharpness of edge and angle and accuracy of form, whilst the substance was so perfectly homogeneous and skilfully burnt that each brick had a metallic ring, and a fractured with a clean surface like broken [illegible]. I will not question the possibility of manufacturing such bricks in England, but I much doubt whether such perfect work has ever been attempted.'

The Greeks attained to great excellence in the art of making bricks. Pliny states that there were three different sizes employed, the *didoron*, six inches in length, the *tetradoron*, twelve inches, and the *pentadoron*, fifteen inches. There are at the present day at Rome brick buildings which were erected seventeen hundred years ago, a sufficient proof of the excellence of the material employed. Among modern nations the Dutch have been distinguished for the excellence of their productions in this kind of manufacture: they have long been in the habit of forming their floors with bricks, and even of paving their streets with the same material, and it has been remarked how long these bricks remain uninjured in such situations. With respect to our own country there is a circumstance which has had an unfortunate effect on the quality of the bricks manufactured, in spite of the excellence of the materials at command and the skill of the workman. By the customary mode of dealing with building land, a plot of ground is let on a building lease for ninety-nine years, or some other defined period, at the expiration of which the land, with the whole of the buildings then existing on it, returns to the possession of the owner of the land. As the leaseholder, therefore, has no interest in constructing a building on the plot of ground so durable as to last longer than the term of his lease, he regulates his mode of construction and his choice of materials on the most economical plan which the term of his lease requires. Hence, among other results, the bricks employed are in general more roughly finished and less perfectly burned than if a longer durability were required of them; and hence the frequent necessity for rebuilding the houses when the leases 'fall in.'

Bricks, it may be pretty well known, are not made wholly of clay. The proper material is a certain mixture of clay and sand, and when such a mixture occurs naturally, under the form of loam, very little preparation is required to render it fit for the brickmaker's use. A mixture of clay and lime also makes good bricks, and hence the use of marl for this purpose. Dr Thomson gives certain reasons why clay and lime would make more durable bricks than those commonly produced:—'For making common bricks the most durable mixture ought to be common clay and limestone or chalk. Perhaps the best proportion would be three parts of clay and one part of limestone or chalk in powder. When such a mixture is exposed to heat, it would experience an incipient fusion, and would thereby be rendered much harder and denser than common bricks. The consequence would be, that it would imbibe much less water, and would therefore be much less liable to crack and fall to pieces in winter than common bricks. For when water has insinuated itself into the pores of a common brick, and is converted into ice, it undergoes an expansion which dislocates the parts of the brick and reduces it to fragments.'

In preparing for the manufacture of bricks the clay, after being dug from the earth, is exposed to the weather for a considerable time, as a means of further disintegrating the stony matter from the decomposition of which the clay has partially been formed, and of pulverizing the clay or bringing it into a state of minute subdivision. When the clay has been thus reduced to a kind of dry powder, it is then mixed up with water to the state of a stiff paste. This process of mixing is one of great importance, since if there be a larger proportion of water in one part of the mass than another, the bricks will be formed of a varying and unequal material, and cannot prove durable. The complete amalgamation of the clay with the water is promoted by a process of kneading, performed in some places by men's feet, in others by horses' feet, and in others by machinery: the last method is the most efficacious, and by proper arrangement would probably be the cheapest, but we believe it is not so much acted on as the other methods. If the clay were originally of a kind which contained no sand, it is necessary to mix sand with it before the process of kneading. The effect of sand is principally to lessen the shrinkage which takes place when clay alone is used. The brickmakers in the neighbourhood of London use sand procured from the bed of the Thames near Woolwich, where it is raised by boats adapted to the purpose. If the grains are somewhat large or coarse, they are said to be better fitted for the object in view than fine sand. The London brickmakers also use a portion of ashes with the clay and sand.

When the kneading of the clay is finished, the very simple process of brick-making is carried on, in the manner which is pretty well known to most persons. The rude sheds in which the brickmakers work are to be seen in many a 'brick-field' near London, although they are driven gradually further and farther away by the increase of buildings. The clay, as prepared by the kneading process, is placed upon the moulder's bench, where a boy or a woman cuts it into pieces somewhat larger than the capacity of the mould. This mould is about ten inches long, five broad, and three deep, so as to yield a brick which, after burning, measures nine, four and a half, and two and a half inches in its three dimensions; for as bricks are a duty-paid article, their dimensions are rigorously fixed by the law, much to the detriment of the manufacture, as has been often shown. The moulder dips the mould in sand, by which its inner surface becomes covered with a fine layer, and then strikes the piece of clay

into the mould with such force and dexterity that all the angles and corners of the mould become filled. He then takes a smooth flat piece of wood with which he scrapes off the superfluous clay. He disengages the brick from the mould by a gentle stroke on the back of the mould, and the wet bricks are arranged in rows on a long board. When sufficiently dry to be handled th[illegible] turned, and subsequently piled up in loose [illegible] rows, which are thatched with straw [illegible] the rain. In this position they are allowed to remain till they have become as dry as they can become in the open air.

The burning or firing of the bricks is an important part of the operations. It is done in one of two ways, either in *kilns* or in *clamps*, the latter of which is the London method. The kilns are simple structures about twelve feet high, in which the bricks are placed on flat arches.

After the bricks are thus arranged, to the number of about twenty thousand, they are covered with old bricks or tile; some brushwood is kindled in the kiln, and a moderate fire kept up till the bricks are rendered as dry as possible, which usually occurs in two or three days. The mouth of the kiln is then filled up with pieces of brick and clay, leaving room only to introduce a single faggot at a time. The fire is then kindled to a fierce heat, and so continued till the bricks are burned. In the other or 'clamp' method of burning the bricks are piled up in long rows, between every two of which is strewed a quantity of cinders to the thickness of three inches. Openings are made between the bricks at various parts, which are similarly filled with cinders, and cinders are also strewed over the top. A fire-place is formed at one end, and a fire [illegible] the heat from which gradually kindles the cinders throughout the mass, and thus burns or bakes the brick. The clamp is sometimes three months in becoming thoroughly burned.

Within the last few years a remarkable degree of activity has been displayed in the invention of machinery for making bricks. Patents have been taken out in great numbers for machines having this object in view, although we believe that, whether it be owing to disinclination on the part of the brickmakers to the introduction of new methods, or to some defect inherent in most of the machines, little progress has yet been made in the use of machine-made bricks.

Most of the new machines act on one of these two principles: either to force the clay into a mould having the proper size and shape of a brick, or to form a long fillet or roll of clay whose width and thickness correspond with the width and thickness of the intended brick, but which is cut off into pieces suitable to the length of the brick. The following, which is one of the new patents, will give an idea of the general character of the first of these two classes of machines. The moulds in the machine are arranged in a horizontal wheel, the rotation of which causes the moulds to pass under a hopper or receptacle, from which they receive their quota of tempered clay. As the mould advances, they pass under a knife, which is adjusted so as to cut off the surplus clay. The bottom of each mould is loose, and by an ingenious arrangement is made to rise in the mould as the wheel revolves, so that by the time one revolution of the wheel is completed the brick is lifted completely out of the mould. The bricks thus elevated are by a piece of mechanism transferred to an endless belt, and conveyed to any desired spot. After the moulds have been used in this way they pass under a sieve to be sanded, before being again filled with clay. There is an arrangement of mechanism by which the proper quantity of clay is forced into each mould as the wheel rotates.

The other mode of operation is favourably exhibited in a machine invented by the Marquis of Tweeddale, a few years ago. This nobleman, having his attention strongly directed to agricultural improvements, and the means of effecting them, found that the use of *tiles* as drains for the outlet of water in the draining of land was not much acted on owing to the expense of purchasing the tiles. He thereupon devised a machine for making draining-tiles more expeditiously and cheaply than they had been before made. The following remarks were made in the 'Farmer's Magazine,' on the efficacy of this machine:—"This machine will make 10,000 drain-tiles a day, with one man and two boys to attend it, and 20,000 of flat tiles for the drain-tiles to lie upon; but if the tiles are broad for roofing, it will make 12,000 a day. These draining-tiles are 15 inches long, so that three machines would make in one season (of 30 weeks) as many tiles as would make a drain from London to York, whereas a man and two assistants will only make 1000 drain-tiles in a day, and these only one [illegible] long, which is 1000 feet per day. If the drain be laid at the distance of 25 feet, it will make in one day sufficient tiles for six acres."

By a little modification of its arrangements the machine may be adapted to the manufacture of bricks as well as tiles. The clay is in the first instance prepared by passing between two large cylinders placed horizontally at a distance of half an inch apart, by which means any small stones or hard substances are crushed and broken. The clay [illegible] after being tempered or kneaded by a kind of mill, is made to pass between two cylinders rotating in contrary directions, by which it is brought to the state of a flat cake suitable in width [illegible] to the tile or brick about to be formed. [illegible] ribbon of clay next passes on to an endless web, which carries it to a third cylinder [illegible] shaped [illegible] to the clay the curved form necessary for a draining-tile, supposing this to be the article under manufacture. There are [illegible] wheels attached to the machine, whose cogs are so regulated that when fifteen inches of tile, or ten inches of brick [illegible] seconds, and cuts off that portion from the rest of the piece, and conveys it on an endless web to a convenient spot for removing it from the machine.

[illegible]—In the [illegible] of [illegible] the [illegible] are em[illegible] [illegible] allowance of [illegible] A substantial [illegible] superiority [illegible] distinguished [illegible] economists, referring to this subject, [illegible] that the [illegible] England. The interest of manufacturers [illegible] workmen, if properly understood, will [illegible] them well. This interest will also teach them not [illegible] latecomers with [illegible] daily [illegible] Of this the same economist gives a remarkable example, [illegible] that [illegible] cotton [illegible] Wesserling [illegible] of January, 1841, the working hours of labour have been reduced half an hour daily in the spinning department, and the produce, so far from diminishing, in [illegible] to the [illegible] of the managers of the establishment, to have increased one twenty-fourth.—*From the Magasin Pittoresque for Feb.* 1843.

[illegible]

[illegible] [illegible] [illegible] ally known [illegible] P[illegible] Ocean [illegible] [illegible] of the [illegible] [illegible] [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] O[illegible] [illegible]	17	2[illegible]	17	[illegible]	[illegible]	[illegible]
[illegible]	17	0	0	150	0	0
[illegible] Charles Saunders's						
Island .	17	28	0	1[illegible]0	[illegible]0	0
[illegible]						
Huahine	16	43	0	151	[illegible]	[illegible]
[illegible]aiatea	16	46	0	151	[illegible]	[illegible]
[illegible] three miles N. of Raiatea						
Bolabola . .	16	27	0	151	52	5
Maurua . . .	16	10	0	152	30	0
[illegible]						
[illegible] Howe Island .	16	16	0	154	12	45
[illegible] Island .	16	28	0	155	24	15

The first five form a cluster which were originally called b[illegible] Captain Cook the Georgian Islands in honour [illegible] George III the other [illegible] about sixty miles [illegible] of Otaheite [illegible] named by [illegible] the Society [illegible]lands in honour of th[illegible] Royal Society of London [illegible] is usually distinguish the latter as the Leeward [illegible] the former as the Windward Islands

Of all these island[illegible] [illegible] much the largest [illegible] elevated All th[illegible] islands are mountain[illegible] [illegible] the interior [illegible] from one to four miles [illegible] of rich [illegible] extending from the base [illegible] land to th[illegible] [illegible] although the outline [illegible] some peculiarity [illegible] from th[illegible] [illegible] in their general [illegible] [illegible] each [illegible] [illegible] and the Scilly [illegible] as they are low [illegible] many feet above the sea [illegible] one hundred and [illegible] in circumference containing an area about [illegible] supposed to [illegible] about [illegible] probably more than thirty [illegible] the others are of [illegible] A corresponding resemblance pre[illegible] in the [illegible] structure of the principal clusters and surrounding islands [illegible] component substances [illegible] same in all [illegible] each has some distin[illegible] peculiarity of its own A full account of these [illegible] interesting [illegible] may be found in Ellis's Polynesian Research[illegible]

There seems no reason to suppose that any of these islands are of [illegible] volcanic origin [illegible] the Sandwich Islands All the Society Islands and many others in the Pacific are surrounded by a belt of coral rock, from two or three to twenty yards in width and situated at distances from a few yards to [illegible] two miles from the shore Against this barrier the long rolling waves of the wide Pacific are driven with terrific violence by the trade winds and arrested by it often rise ten twelve or fourteen feet above its surface These reefs protect the low lands from the violence of the sea for while beyond them the surface of the water is agitated by the slightest breeze, all within is smooth water There is usually a break or opening in these marine barriers which offers an easy passage for shipping In Tahiti there are several good ports those on the [illegible] west coast, Matavai Papawa Toanoa and Papiete are the most frequented The [illegible] is various The sides of the mountains are frequently covered with a thin layer of light earth, but the summits of many of the interior hills present a thick stratum of st[illegible]red

ochre or yellow marl. This is seldom found on the lofty mountains composed of basalt or cellular volcanic stone, but generally covers the lower hills that rise between the interior mountains and the shore. The natives use it as a pigment for staining or painting their doors, window-shutters, canoes, &c., and, when mixed with lime, the walls of their houses. The level tracts along the coast are the most valuable parts of the land. The soil of those tracts is a rich alluvial deposit, with a considerable mixture of vegetable mould, and is exceedingly prolific.

Rain is much more frequent in the Society than in the Sandwich Islands, during the whole year; but, except in the rainy season, it is seldom heavy or lasting. The rainy season, the only variation of the tropical year, occurs when the sun is vertical, and generally continues from December to March; during this time the climate is more insalubrious and the sickness of the inhabitants greater than at any other period. Thunder and lightning are frequent, especially in the rainy season.

Hogs and dogs, and sometimes rats, were the only animals whose flesh was formerly eaten by the natives. The missionaries have introduced all our domestic animals; and all have succeeded very well, except the sheep. Many of the natives now possess hundreds of cattle, which, with their other produce, they sell, with mutual advantage, to the ships which touch at the islands for refreshments. Rabbits could not be preserved; cats have become common in houses, and are great favourites. The birds of these and the neighbouring islands are not distinguished by brilliancy of plumage or melody of song. There are, however, several varieties, and some of them in immense numbers. The most numerous class are the aquatic fowl. The albatross (*diomeda exulans*), the tropic bird (*phaeton ætherius*), several kinds of petrel, with others, abound in all the islands, especially in Borabora and Mauarua. Among the lakes are several kinds of heron; and wild ducks resort to the lagoons and marshes. There are several kinds of birds of prey, and a number of the woodpecker tribe, with some small paroquets of rich and splendid plumage. The turtle-dove is found in the inland parts of some of the islands, and pigeons among the mountains. Among the few singing-birds the most conspicuous is that called by the natives *Omaomao*, which in appearance and note much resembles the thrush. Poultry was found in abundance in the islands when originally discovered, and have, of course, been since improved and extended.

The vegetable productions are numerous, especially of the plants which supply food for man. The bread-fruit trees and cocoa-palms are regularly planted, and batatas, yams, taro, and bananas are cultivated with care; the sugar-cane, which is of excellent quality, tobacco, and some other tropical plants are also cultivated. Cotton and indigo are only cultivated by the Europeans, the natives being too indolent to bestow the necessary labour on them. Several wild plants also afford food, especially the arrow-root, which is collected in May, and a considerable quantity of which is exported; there are also the casuarina-tree, a kind of chestnut, and figs. Cloth is made, as in other islands of the Pacific, of the inner bark of the bread-fruit tree, the paper mulberry-tree, and the hibiscus; of the last also ropes are made. Oil is extracted from the cocoa-nut. The interior produces timber in great abundance. Forests cover all the mountains of Tiarrabooa, and the southern declivities of those of Opureone. Some vessels have been built of the timber.

The Society Islanders are generally above the middle stature, but their limbs are much less muscular and firm than those of the Sandwich Islanders, whom in many respects they resemble; but they are more robust than the Marquesans, who are the most light and agile of the inhabitants of Eastern Polynesia. In size and physical power they are inferior to the New Zealanders. The countenance of the Society Islanders is open and prepossessing, though the features are bold, and sometimes prominent. The facial angle is frequently as elevated as in the European, except where the frontal and the occipital bones have been pressed together in infancy. The prevailing complexion is an olive, a bronze, or a reddish-brown, equally removed from the jet-black of the African and Asiatic, the yellow of the Malay, and the red or copper colour of the aboriginal Americans. Considerable variety nevertheless prevails in the complexion of the population of the same island, and as great a diversity among the inhabitants of the different islands.

The mental capacity of the Society Islanders has hitherto been only partially developed. They are remarkably curious and inquisitive; and, compared with other Polynesian nations, may be said to possess considerable ingenuity, mechanical invention, and imitation. Totally unacquainted with the use of letters, their minds could not be improved by any regular continued culture; yet the distinguishing features of their civil polity—the imposing nature, numerous observances, and diversified ramifications of their superstition—the legends of their gods—the historical songs of their bards—the beautiful, figurative, and impassioned eloquence sometimes displayed in their national assemblies—and, above all, the copiousness, variety, precision, and purity of their language, with their extensive use of numbers, warrant the conclusion that they possess no mean mental capabilities.

By diseases, wars, infanticide, and the use of ardent spirits, the large population which these islands formerly contained was reduced to a mere remnant when the missionaries came among them, and was in rapid progress to extinction. The general adoption of Christianity put a stop to the evils in which this decline had originated; but for some years after, the number of deaths considerably exceeded the births. About the years 1819 and 1820, the births were nearly equal to the deaths, and since that period the population has been rapidly increasing. The latest information estimates the inhabitants of these islands at eighteen or twenty thousand. Most of the natives can now read and write. Their moral conduct has become more regular, and their social condition much improved; they have acquired the knowledge of various useful arts, and profitable branches of commerce have been opened. Numerous vessels of from thirty to eighty tons burden are usefully employed in trade, and in maintaining an intercourse between the several islands. A press has for many years been actively engaged in supplying the natives with publications in their own language, suited to their wants and their condition.

For these advantages the Society Islands are chiefly, we may almost say entirely, indebted to the exertions of the missionaries. Under their influence Pomare II. embraced Christianity in 1816, and framed a constitution and a code of laws, which, in 1825, under his son, was extended so as to include a parliament, of which the members are returned from the several districts by popular election. The legal penalties are severe, but extend to death in but few cases, and there is a regular police. Captain W. F. Beechey, who visited these islands, in 1826, in the Blossom, thus describes the proceedings of a legal court:—"The court was ranged upon benches placed in successive rows under the trees, with the prisoners in front, under the charge of an officer with a drawn sabre, and habited in a volunteer's jacket and a maro. The aava-rai of the district in which the crimes had been committed took his place between the court and the prisoners, dressed

in a long straw mat, finely plaited, and edged with fringe, with a slit cut in it for the head to pass through; a white oakum wig, which, in imitation of the gentlemen of our courts of law, flowed in long curls over his shoulders, and a tall cap surmounting it, curiously ornamented with red feathers, and with variously coloured tresses of human hair. His appearance without shoes, stockings, or trowsers, the strange attire of the head, with the variegated tresses of hair mingling with the oakum curls upon his shoulders, produced, as may be imagined, a ludicrous effect. The prisoner being brought up, the aava read certain passages from the penal code, and then accused the prisoner of having stolen a gown from a European resident. He instantly pleaded "guilty" to the charge, and thereby saved a great deal of trouble. He was then admonished against the repetition of evil practices, and fined four hogs, two to the king, and two to the person from whom the property had been stolen. Bail is not necessary in Otaheite; and the prisoner, consequently, was allowed to go where he pleased; and he proceeded to such of his friends as were most likely to supply him with a hog."

Notwithstanding, however, the efforts of the missionaries, the morality of the islanders continues very loose, especially in respect to chastity and honesty; nor has the executive sufficient power to exact obedience from the Europeans, who are now numerous, when they are refractory. Sir Edward Belcher, on his visit in the Sulphur, in 1840, was called upon for his assistance in enforcing the verdicts of Otaheitan juries against British subjects, which, greatly to his credit, he readily afforded, and he narrates an instance in which the Queen's husband was indicted before a jury for a violation of the law in connexion with one of these cases, where, after several efforts to avoid the trial, he was found guilty, though his punishment only amounted to a lecture. Sir Edward also notices the progress made in civilization in the interval between 1826 and 1840, particularly in regard to clothing, which had become in a great degree European; but he adds with this progress they appear to have lost much of their old simplicity of character, and even much of their religious feelings. Indeed the missionaries seem, by their extreme strictness, to have lost their hold on a people indolent, sensual, and addicted to pleasure; they absolutely prohibited their national dance, and most of their other peculiar customs; and when the first excitement of their religious feelings had subsided, they naturally reverted to their remembrance with feelings of regret. It is no doubt extremely difficult to decide in such cases what may be advisably allowed, but it must evidently be dangerous to deprive an imperfectly civilized and but half-occupied people of their usual active amusements. From the testimony of Captain Beechey, the character of the dance, to which the missionaries no doubt with justice object, might have been, and was occasionally even by themselves, modified so as to be wholly inoffensive. At any rate it is supposed that it was the unpopularity arising from these restrictive measures that gave rise to the recent step taken by the nation of placing itself under the protection of France. This event took place in 1842: Roman Catholic missions have been already formed and sent out, and other steps taken by the French government for securing a permanent establishment in the islands.

Nest of the Halcyon or Kingfisher.—Setting aside the fable of the floating cradle in which during the Halcyon days the bird was said to rear its young, we shall find that ornithologists have differed not a little as to the actual nest of this brilliant bird. Pennant says that it makes its nest in holes in the sides of cliffs, which it scoops to the depth of three feet, and in holes in the banks of rivers, chiefly those which before belonged to the water-rat; and he states the number of the eggs to be from five to nine, of a most beautiful transparent white. The nest, he adds, is very fetid. Montagu, in his 'Ornithological Dictionary,' says that the bird generally takes possession of a rat's hole to deposit its eggs: he then proceeds as follows:—"The many curious accounts which have been given of the nest of this bird induced us to take some pains to discover the fact. The result of our researches are (is), that the hole chosen to breed in is always ascending, and generally two or three feet in the bank; at the end is scooped a hollow at the bottom of which is a quantity of small fish-bones, nearly half an inch thick, mixed in with the earth. This is undoubtedly the castings of the parent birds, and not the young, for we have found it even before they have eggs, and have every reason to believe that both male and female go to that spot, for no other purpose than to eject this matter, for some time before the female begins to lay, and that they dry it by the heat of their bodies, as they are frequently known to continue in the hole for hours, long before they have eggs. On this disgorged matter the female lays to the number of seven eggs, which are perfectly white and transparent, of a short oval form, weighing about one dram. The hole in which they breed is by no means fouled by the castings; but before the young are able to fly it becomes extremely fetid by the fæces of the brood, which is (are) of a watery nature, and cannot be carried away by the parent birds, as is common with most of the smaller species. In defect of which, instinct has taught them to have the entrance of their habitation ascending, by which means the filthy matter runs off, and may frequently be seen on the outside. We never could observe the old birds with anything in their bills when they went to feed their young; from which it may be concluded they eject from their stomach for that purpose.' Mr. Selby, after noticing the ejection of bones and other indigestible parts, in pellets, by the mouth of these birds, goes on to state that they breed in the banks of the streams they haunt, either digging a hole themselves, or taking possession of that of a water-rat, which they afterwards enlarge to suit their convenience. He then proceeds as follows.—"The bearing of the hole is always diagonally upwards, and it pierces two or three feet into the bank. The nest is composed of the above-mentioned pellets of fish bones, ejected into a small cavity at the farther end of this retreat, and upon which the eggs are laid, to the number of six or seven, of a transparent pinkish white." He then quotes the remarks of Montagu on the sloping direction of the hole, and the use of that direction in carrying away offensive matter. ('Illustrations of British Ornithology,' vol. i.) Mr. Rennie, in his edition of Montagu's 'Dictionary,' observes, that from the high authority of Montagu, the description above given has been copied by every recent writer, with the exception of Temminck, who says nothing on the subject, and Wilson, who says ('Am. Orn.,' iii. 60), of his belted kingfisher (*Alcedo Alcyon*), that "its nest is neither constructed of glue nor fish-bones." Mr. Rennie then proceeds thus:—"We are certain of the fact that this will apply equally to our own kingfisher. In the bank of a stream at Lee in Kent, we have been acquainted with one of these nests in the same hole for several successive summers, but so far from the exuviæ of fish-bones ejected, as is done by all birds of prey, being dried on purpose to form the nest, they are scattered about the floor of the hole in all directions, from its entrance to its termination, without the least order or working up with the earth, and all moist and fetid. That the eggs may by accident be laid upon portions of these fish-bones is highly probable, as the floor is so thickly strewed with them that no vacant spot might be found, but they assuredly are not by design built up into a nest. The hole is from two to four feet long, sloping upwards, narrow at the entrance, but widening in the interior, in order perhaps to give the birds room to turn, and for the same apparent reason the eggs are not placed at the extremity. I am not a little sceptical as to its sometimes selecting the old hole of a water-rat, which is a deadly enemy to its eggs and young; but it seems to indicate a dislike to the labour of digging. It frequents the same hole for a series of years, and will not abandon it, though the nest be repeatedly plundered of the eggs or young. The accumulation of cast-bones in one of these old holes has perhaps given origin to the notion of the nest being formed of them." Mr. Gould, in his 'Birds of Europe,' states that the eggs are deposited in a hole, such as those above alluded to, by the female, without making any nest.—*Penny Cyclopædia.*



[Stepping Stones.]

THE RIVER DUDDON.—No. II.

[Continued from p. [illegible].]

The old Whitehaven road crosses the river at Cockley Brig, and here leaves it, passing over the side of the mountain called Hardknot into Eskdale. Somewhat more than halfway down the hill, a little on the right of the road, are the remains of a Roman fortress, "Hardknot Castle," as it is called, which is well worth a visit: there is a fine and very extensive view from it: Scawfell in particular is seen to great advantage. From Cockley Brig the scenery, for a mile or so, is rather tame along the beck, but if there is little in the vicinity there is much in the stream itself to delight us. Now it has assumed something of the port and strength of a river: the water too, which, like Cotton's favourite Dove, was "black at its source because it springs from the mosses," has, like it, become so clarified by the addition of several clear springs bigger than itself, which gush out of the limestone rocks, that in a few miles you will find it one of the purest crystalline streams you have seen. Wordsworth notices this. "The water," he says, "is perfectly pellucid, through which in many places is seen to a great depth its bed of rock or blue gravel, which gives to the water itself an exquisitely cerulean colour: this is very observable hereabouts." And here too are *The* Stepping Stones: every reader of Wordsworth will remember them, and most will "have a vision of his own" about them. He need not fear that the reality will fall short of his conception. We have seen many, but none [illegible] graceful:—

> "They [illegible]
> Chosen for ornament—stone matched with stone
> In studied symmetry, with interspace
> For the clear waters to pursue their race
> Without restraint."—*Sonnet IX.*

And they are as harmonious in colour as symmetrical in form. Of a delicate white, with the slightest admixture of blue, they present, as they are reflected in the crystal stream, an image the eye dwells on with a *continuous* pleasure. They are a something to remember. Hitherto our stream has wound quietly among the masses of crag that have at various times been brought down by it from [illegible] but [illegible] [illegible] bold [illegible] [illegible] which it has [illegible] many [illegible] for

> [illegible]
> [illegible]
> [illegible]
> [illegible]
> [illegible]—*Sonnet XII.*

The traveller should not leave the bed of the river here while he can make his way along it: every step brings out some new or quaint device of our fairy [illegible] guide. Not far from the place above [illegible] [illegible] a chasm where the [illegible] of the fanciful [illegible] ing for the [illegible] spot is ever [illegible] upon [illegible] Wordsworth call it the "Fairy Chasm." [illegible] [illegible] of a bright blue grey tint [illegible] the water almost into azure [illegible] shapes as that [illegible] [illegible] And [illegible] delighted to [illegible] [illegible] [illegible] is very fine [illegible] Hardknot [illegible] mountains on the other [illegible] by the majestic mass of Coniston Old Man. Directly in front [illegible] Wallabarrow crag and the [illegible] with several mountains of moderate elevation and graceful form in the distance.

Here we must leave our stream awhile. We have now reached Seathwaite, where for the present we [illegible] Wordsworth indeed, makes his poem a summer day's journey, but he admits this to be a poetic [illegible] [illegible] is quite impossible to explore the scenery of the Duddon in that time. The hasty visitor may indeed [illegible] it all, at least [illegible] as he usually sees anything [illegible] two days; but the man who has learned to look on nature with a truer feeling will not, if he have leisure, think as many weeks too much to devote to this lovely [illegible] Seathwaite is a good resting place: it is [illegible] [illegible] the finest portion of the scenery, and [illegible] connected with it some interesting associations, upon which we shall now touch. It contains [illegible] [illegible] in which the accommodation is rude, but the parties who keep it are civil and desirous to oblige, and the genuine traveller will be content with these. He need not, however, fare amiss: fell mutton, and [illegible] [illegible] [illegible] he may always obtain, and the [illegible]

[illegible] he will, as Mrs. Glasse directs, 'catch them first;'—for Duddon is what 'honest Izaak' calls 'a trouty stream.' With these and the usual addenda procurable in a north country farm, a moderate man may have, as Cowley says, 'not so many choice dishes at every meal, but at several meals all of them, which makes them both the more healthy and the more pleasant.'

Seathwaite is remarkable as the place in which 'Wonderful Robert Walker' dwelt so many years. Wordsworth has given a very full and interesting account of him in his notes to 'The Duddon,' to which, or to the second volume of 'The Pursuit of Knowledge under Difficulties,' the reader may refer. It may here suffice to say that he was born in 1709 at Under-crag in Seathwaite, and was the youngest of twelve children. Being sickly in youth he was 'bred up a scholar,' and after acting for some time as a schoolmaster he was ordained, and about 1735 became Curate of Seathwaite, in which he remained till his death, sixty-six years afterwards. The value of his curacy when he entered upon it was 5l. per annum, with a cottage; about the same time he married, and his wife brought him, as he says, 'to the value of 40l. for her fortune.' He had a family of twelve children, of whom however only eight lived; these he educated respectably [illegible] even munificent [illegible] and generous to the needy [illegible] although the income of his curacy never exceeded 50l. [illegible] at his decease he left behind him no less a sum than 2000l.; and such a sense of his various excellences was prevalent in the country that the epithet of *Wonderful* is to this day attached to his name. As Wordsworth [illegible] something so extraordinary [illegible] further explanatory [illegible] but for this we refer to the works before [illegible].

that he spun the wool, needed for the family clothing himself, which was made up into the various garments by the female portion of the family; while he spun he taught the children of his parishioners; then he assisted his neighbours in hay-making, sheep-shearing, &c., besides serving as scrivener, and in various ways rendering them assistance; he had an acre or two of land which he tilled himself, and also [illegible] and attended to a few sheep and a couple of cows. Many of these employments and others in which his biographer relates him to have been engaged, are sufficiently understood; but we were told [illegible] of the older inhabitants [illegible] one still in [illegible] and which Wordsworth either did not hear of or thought [illegible]. At that time there was no public-house in the place, and Walker was accustomed [illegible] to supply any who required such refreshment with ale of his own brewing [illegible] extra drink [illegible] his house [illegible] the usual place of drinking it being [illegible] adjacent field. The circumstance would hardly be worth recording, did it not serve to illustrate the simplicity of manners that prevailed. Such a thing [illegible] hardly be conceived of [illegible] that [illegible] his house [illegible] that up to the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

(Ch[illegible])

tenderly alive to the duties of his pastoral office: truly, as Wordsworth remarks, "in this extraordinary man things in their nature adverse were reconciled."

Very many of the simple homely customs ascribed to Walker are yet far from obsolete in the neighbourhood. In the farm-houses the master of the house may still be seen at the head of a long table, with his farm servants sitting down to their meals as part of the family. Rush candles are yet employed in common, "white or tallow candles being reserved," as with Walker, "for important occasions." And we imagine tea is even now very little used, except by the more wealthy farmers, at whose houses indeed we have seen it. Neither Walker nor his wife ever partook of it, though they kept it in the house for visitors or such of his own family as had been accustomed to this refreshment elsewhere. Porridge was their substitute, and it is still employed at the meals answering to breakfast and tea. At the public-house at Seathwaite, the landlord of which is also a farmer, this is the case, and we were somewhat amused, after we had finished our tea, to see the tea-pot very quietly taken to the landlord, and tea made for him alone, from the tea-leaves which had just served us. When the master of the house happened at such times to be from home, his mother (he had no wife), an old but vigorous dame, appropriated the luxury to her own use.

There are few places in our country perhaps that have changed so little as has Seathwaite since Walker's time; there have been no new buildings, nor has anything altered the external look of the place, unless it be the addition of the public-house, and that is an old farm-house. Walker's own house has been altered since his death, but only so much as to render it somewhat more convenient to his successor. Nor have the inhabitants greatly changed; they are still the same frugal, industrious, quiet, church-going race: there is indeed a slight change in the last item. Walker congratulates himself that there is "not one dissenter of any denomination in the parish," and now there are several Methodists, and two or three Baptists, who have occasional meetings at private houses, for there is still no dissenting meeting-house in Seathwaite; but the chief part of the inhabitants are still steady churchmen.

The chapel in which Walker so long officiated is a simple structure, a low oblong building with a plain porch, and one bell, hung visibly in a most primitive-looking belfry, with the bell-rope hanging down on the outside. It differs little in its appearance from many other chapels scattered thoughout the more retired parts of the locality; it is not, however, so small as many of them, that at Wasdale Head for instance, which has seven pews, one being for each of the six families in the chapelry, and the remaining one for strangers. Seathwaite Churchyard contains a fine old yew, and near it a sun-dial, by which is Walker's grave-stone, a plain blue slab, shown in the engraving: upon it is the following inscription:—

"In memory of the Reverend Robert Walker, who died the 25th day of June, 1802, in the 93rd year of his age, and 67th of his curacy at Seathwaite.

"Also of Anne, his wife, who died the 28th of January, 1802, in the 93rd year of her age."

The noticeable thing in the interior of the chapel is Walker's pew, which is still lined with cloth woven by his own hand—it is the only pew in the chapel so distinguished.

There is about Seathwaite chapel an air of antique rudeness, that at once carries the mind back to a bygone age; it speaks as strongly of other times as the noblest minster—but how differently! We advise the visisor, if he can, to spend a Sunday there. Few sights would be more interesting to one not thoroughly sophisticated than the old kirk-yard on a Sabbath morning. *Then* the old kirk—the noble yew, older still than the kirk, with the sun-dial by it—the few gravestones scattered about, and the everlasting hills—which form so noble a background to the whole—all seem to wear an air of deeper repose and more silent grandeur than ever. But presently the bell tolls, and its first sounds have hardly passed away when one and another of the dalesmen come quietly in, giving and receiving a simple greeting, and then separating into little groups, or loitering singly about the graves, apparently recalling, many of them at least, the memory of those who sleep below, while others collect under the shade of the old yew; the fairer portion of the congregation meantime resting on the benches within the porch, but none, at least in fine weather, enter the chapel. Soon, however, as the bell's last stroke has sounded, the clergyman, a happy-looking old man—apparently no unworthy successor of Walker—may be seen making his way towards the kirk, exchanging with all a smile, a word, or a bow of genuine old-fashioned courtesy (and the stranger will be sure to receive one more marked than others), and after a little longer talk with his fair parishioners in the porch, he enters the chapel, followed by his charge. Next to seeing Sir Roger de Coverley go to church, it is the prettiest sight of the kind one could wish to behold.

"Upon the Seathwaite Brook," says Wordsworth "at a small distance from the parsonage, has been erected a mill for spinning yarn; it is a mean and disagreeable object, though not unimportant to the spectator, as calling to mind the momentous changes wrought by such inventions in the frame of society." We went to look at the mill, and found it with its roof partly fallen in, its wheel broken; and on trying the door, its hinges, rusted from long disuse, gave way The machinery, too, though in appearance undisturbed since it was last used, was decayed, the web crumbling at the slightest touch. Our poet, were he to visit it now, might find new matter for reflection on the changes wrought by the progress of invention, which has rendered this as obsolete as it made unaided hand-labour.

[To be continued.]

ON ROTTEN-STONE AND EMERY.

THERE are two substances, apparently very humble, which however contribute in an important degree to the perfection of various instruments, both of use and of ornament. These are *Tripoli*, or *rotten-stone*, and *Emery*, both extensively employed in grinding and polishing glass, metals, stones, and other hard substances. The names applied to these two substances seem at first to be odd and unmeaning; but the origin appears to have been thus:—that 'Tripoli' is the name of the country whence one of these polishing substances was first brought; that 'rotten-stone' expresses significantly its mineral origin; and that 'emery,' with its French, Italian, Latin, and Greek synonymes, 'emeri,' 'smeriglio,' 'smyris,' and 'smuris,' all come from the Greek verb 'to smooth' or 'to polish,' and thereby indicate the purpose to which the substance is applied.

For a long time the true nature of tripoli was not known, whether it was of a clayey or a flinty origin. This arose from certain differences in the kinds brought from different places. Thus the tripoli of Poligné, near Rennes in Brittany, is fusible; it has several different shades of red colour, and in some parts trunks of trees, imbedded in it, seem almost to have been changed into tripoli. Tripoli is found at Ménat, near Riom, department of Puy-de-Dôme, in beds which

appear to have been formerly schists (slaty or laminated rocks), changed by the action of volcanic fire. It occurs in the quarries of chalcedony at Volterra in Tuscany, and assumes very much the appearance of the débris or decomposed fragments of chalcedony. In Saxony it occurs in the coal-strata at Postchappel; and in Bohemia it is found in thin beds of a kind of pitchstone. The tripoli of Venice is the most esteemed; it comes from the island of Corfu, and has a yellowish-red colour. The tripoli from Derbyshire, called 'rotten-stone,' occurs in the upper part of the great shale stratum which covers the mountain-limestone.

The nature and formation of the Derbyshire 'rotten-stone' formed the subject of a communication from Mr. Martin to the Manchester Philosophical Society some years ago; and as that paper threw much light on the subject, we will transcribe the principal results.

Kirwan had before given an opinion that some varieties of tripoli were of volcanic origin, while others were the result of decomposition; and Mr. Martin proceeded to show that the Derbyshire rotten-stone is of this latter kind, and offered a conjecture that black marble, or some other dark variety of limestone, is the kind of rock whose decomposition forms rotten-stone. Of the rotten-stone of Bakewell, as an example of that of Derbyshire generally, Mr. Martin states that it is deposited in the uppermost stratum of limestone. It occurs in different parts of the moor; frequently on the surface of the limestone, immediately under the vegetable mould; but it is procured in the greatest quantity in a long or somewhat trough-shaped hollow, intersected by several broad irregular fissures, which are filled up with small fragments of limestone. In these fissures the rotten stone occurs at the depth of a few inches below the surface, and from that to ten or fifteen feet.

The Derbyshire rotten-stone Mr. Martin describes as being produced in two distinct states. In the one state, the stone when dry has an indurated and sometimes stony consistency, with an earthy texture, a fracture sometimes shell-like and at other times slaty, a smooth and rather greasy feel, and a colour between yellow and brownish-grey. The other kind has a loose and powdery substance, a greater roughness to the touch, and qualities generally more resembling those of earth than of rock. The hard rotten-stone (as the former is called by the diggers) occurs in detached nodular lumps, dispersed through the débris of the limestone; whereas the soft rotten-stone occurs as a kind of spongy earth, either coating the more indurated variety or deposited in considerable quantities under the débris on the surface of the limestone rock. Water, from the upper part of the moor, is constantly draining through the loose materials which fill the hollow and fissures of the rotten-stone district. Among the rotten-stone are found fragments of chert, and other fragments in all the intermediate stages between perfect limestone and rotten-stone.

From all these circumstances combined, Mr. Martin concludes that rotten-stone is produced by the disintegration of a particular variety of limestone, probably a black marble.

The use of tripoli or rotten-stone as a polishing material is so very simple and so well known, that we need not stop to remark upon it, but may proceed to notice the nature and sources of the other substance which we have named, viz. *emery*.

It is not one of the least curious circumstances which mineralogical analysis has brought to light, that the sapphire, the ruby, adamantine spar, and emery are very nearly the same substance. The sapphire, which occurs in rolled masses and crystals, contains ninety-two per cent. of alumina, the rest being silica and oxide of iron. The ruby, occurring in six-sided prisms, contains ninety per cent. of alumina. Adamantine spar, or common corundum, used extensively in the East Indies in the polishing of gems and stones, contains ninety-one per cent. of alumina. Lastly, emery contains eighty-six per cent. of alumina; thus approaching very closely to the other three, and having, like them, only two other component ingredients besides alumina, viz. silica and oxide of iron.

Mr. Tennant, some years ago, was the first to discover that the emery of Europe is nearly the same substance as the corundum of the East. For many centuries emery has been found in one of the Greek islands, Naxos; but the relation between it and corundum is a modern discovery. Pliny, in the description which he has given of a green stone which the ancients called topaz, says it was the only gem that admitted the impression of a file; that all other gems were polished by means of the "grinding-stones of Naxos:" and in another part of his work he speaks of "naxium" as being used in polishing marble and gems.

Mr. Tennant, in the paper in which he showed the composition of emery, and which was published in the 'Philosophical Transactions' at the beginning of the present century, remarks:—"The hardness of emery, as far as I could judge by its cutting rock-crystal and flint, appeared to be equal to that of diamond spar. The latter could not be scratched by the former; but as emery has not a surface sufficiently polished to render a mark visible, the converse of this could not be tried. All the emery which is used in England is said to be brought from the islands of the Archipelago, and principally from Naxos. In those places it is probably very abundant; as the price of it in London, which I was told was eight or ten shillings the hundredweight, appears little more than sufficient for the charges of carriage. Though I saw a very large quantity in one place (more than a thousand hundredweight), I could not find any pieces of a crystallized form: possibly the great proportion of iron usually mixed with it may prevent its crystallization. The whole consisted of angular blocks incrusted with iron-ore, sometimes of an octahedral form, with pyrites, and very often mica. The latter frequently penetrates the whole substance of the mass, giving it when broken a silvery appearance, if seen in the direction in which the flat surfaces present themselves to the eye." The statistical part of these remarks would probably require modification, to suit the state of things at the present day.

The island of Naxos, spoken of by Pliny as containing abundance of emery, has been visited by several travellers who have offered a passing word on the existence there of the mineral. Tournefort, a hundred and thirty years ago, said that in his time the emery-mines were situated at the bottom of a valley beyond a place called Perato, in the island of Naxos; but that the inhabitants also found emery while ploughing the earth, and carried it down to the sea-coast, where the English ballasted their ships with it; and he further states that it was so cheap that twenty-eight hundredweight of it might be purchased for a crown. Dr. E. D. Clarke, while sailing from Patmos to Paros, touched for a short time on the southern coast of the island of Naxos, and, amongst other minerals, made a few remarks concerning emery. "The famous emery of Naxos is situated in an opposite part of the island, towards the north-west. The author has ever since regretted that his rough treatment at sea entirely banished from his recollection all thought of this important part of the natural history of Naxos. . . . . The author has succeeded in obtaining, by the accidental fracture of the compact emery of Naxos, as regular an hexagonal form as that which may be

noticed in the corundum of the Mysore, nor is it unreasonable to infer, as a probability, that Telesia, or perfect corundum, under the forms exhibited by the oriental sapphire and oriental ruby, may be found by future travellers in the [illegible] emery at Naxos."

The [illegible] of emery [illegible] for grinding and levelling, d[illegible] evidently on the extreme hardness of its particles. The particles wear away the protuberant parts of the surface to be levelled, more rapidly than they themselves wear away, it is in fact a contest between two rubbing surfaces as to which will yield to the other; and the popular phrase of "diamond cut diamond" expresses significantly the fact that nothing but the diamond can cut the diamond, it being harder than all other substances, emery included. One of the most important practical applications of this substance is in the grinding of lenses for microscopes, telescopes, and other mathematical instruments. Glass, being ranked among the hardest of substances, can be cut or worked by very few others; and it is important to obtain such an agent at a cheap rate.

The rocky emery is brought into the state of powder or of grains by a process extensively pursued in the islands of Jersey and Guernsey, and thus described by a French writer:—The emery is pounded in a steel mortar, and the pounded mass thrown into water, and mixed up with it. The mixture is left to repose until the water contains nothing but particles which are too fine and [illegible] to be of service. The water is then thrown away, and new water poured on the emery; this is mixed, stirred up, allowed to settle, and the water again poured off. By this means the finest sort of emery is produced. A fresh supply of water is added, and allowed to remain a quarter of an hour, when, being poured off, the next finer kind of emery is obtained. Another supply of water is then added, and treated in a similar way, leading to the production of a third quality of emery. A succession of such processes enables the manufacturer to obtain several different degrees of fineness, thus adapting the emery to the purposes for which it is intended.

Sir David Brewster, in one of his Treatises on Optics, while speaking of the grinding of lenses for optical purposes, remarks:—"Emery of different degrees of fineness may be made in the following manner: Take five or six clean vessels, and having filled one of them with water, put into it a considerable quantity of flour emery. Stir it with a piece of wood, and after standing two seconds, pour the water into the second vessel. After it has stood about twelve seconds, pour it out of this into a third vessel, and so on with the rest; and at the bottom of each vessel will be found emery of different degrees of fineness, the coarsest being in the first vessel, and the finest in the last." This process may be considered in some respects as a sequel to that noticed above.

As a mode of explaining how emery is used by the optician we will briefly detail the common mode of making a convex lens, such as an "old-sight" spectacle lens. A grinding-tool is first prepared, by turning a piece of brass to a concave surface, and making it perfectly regular by the use of emery. Then a piece of glass, fitted for optical purposes, is cut to a circular form, and fixed with black pitch to a wooden handle, by which it may be conveniently held. The concave surface of the tool, being uppermost, is sprinkled with powdered emery, and the glass rubbed upon it till worn away to a convex surface. In such an operation it is evident that the brass does not act as an abrading surface; it is merely a receptacle properly shaped for receiving the emery powder, and for regulating the movement of the glass while under the operation.

A very convenient form of using emery is when a thin stratum of it is cemented or glued to a sheet of paper. "Sand-paper," "glass-paper," and "emery-paper," are three examples of hard substances used in this way. The flinty particles which constitute sand, the hard particles of pounded glass, and pounded emery, have, according to the mode in which they are applied, degrees of hardness adapted to various processes in the mechanical arts. Other hard substances, more or less of a vitrified kind, are occasionally used for this purpose; thus, the slag, or exceedingly hard refuse from the iron-works, is in some towns ground to powder, and used, either singly or in combination with one of the other three materials above mentioned, as an abrading agent.

General Industry of England.—The extraordinary degree of producing power which exists in this kingdom has been shown in the second section of this work. Not only is the proportion of persons in the community who pass their lives in active industry, labouring with their hands or their heads, greater in this than in almost every other well-peopled country in Europe, but the amount of skilled labour performed in a given time by any given number of our countrymen is commonly greater than that accomplished by the like number of any other people in Europe. To this circumstance it is in great part owing that with a higher rate of daily wages paid for fewer hours of toil than are required in other countries, our manufacturers have been able, under otherwise adverse circumstances, to maintain the superiority over their rivals. Many of the [illegible] in France and in Germany, have contrived to possess themselves of our best machines, notwithstanding the legal prohibition to their exportation; but have not hitherto been unable to endue their workmen with the degree of energy and skill for which the English artisan is distinguished, nor in general are [illegible] to compete with us in any but the commonest kinds of fabrics.—*Porter's Progress of the Nation.*

Improved Vegetable Food.—Among the questions that arise in the minds of the friends of the poor is whether articles now rejected or neglected as food may not be sufficiently nutritious and palatable to be suited for ordinary consumption. We all know how largely prejudice is mixed up with our feelings on the subject of food; and that even the potato was at one time proscribed by the Puritans. A Middlesex peasant would not dream of cooking nettles, and yet in Yorkshire and Lancashire they are, when young, a common ingredient of broths. We also find that the French cottager will succeed in preparing good and wholesome food from substances which in this country are not thought of. Among these it is the kidney-bean which promises best. We use it only in the young and tender state. The French employ the ripe seed, and, when properly dressed, an excellent and a [illegible] food it proves to be. If instead of cutting the young pods, and thus wasting the produce of such plants, they were allowed to ripen their beans, a saving of some importance would be effected in the economy of cottagers. We are led to these remarks by a letter from Mr. Billington, who mentions the following case:—"A very poor family in Shropshire being hardly pressed for food, the husband being unable to get employment, the wife bethought herself of some kidney-beans she had by her, and put some in an earthen vessel containing a sufficient quantity of water, a few lumps of bacon, with a little seasoning of pepper and salt, and placed them in an oven to stew, two or three hours, till they became as tender as the best boiling-peas." The peasants were agreeably surprised to find that the beans, which they had fancied unfit even for the food of pigs, would thus furnish them with a nice mess, for they did not know that such seeds are served up at the tables of the wealthy in this country under the name of haricots, and are a favourite vegetable with continental nations. Hitherto it has been the universal custom in this country to throw away the dried beans of the scarlet-runner, if not wanted for seed. We trust it will henceforth be remembered that excellent food may be had from one of those plants which now is made to scramble over the hedges and walls of a cottage garden chiefly for the sake of ornament. It must, however, be borne in mind that, although the beans of the scarlet-runner are good, the roots, which are fleshy and perennial, and look tempting enough to be eaten, are really poisonous, as was unfortunately proved last [illegible] at Chelsea.—*Gardener's Chronicle.*



[Departure of young St. John for the Desert.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XII.

Filippo Lippi and Angelico da Fiesole.

Contemporary with Masaccio lived two painters both gifted with surpassing genius, both of a religious order, being professed monks—in all other respects the very antipodes of each other; and we find the very opposite impulses given by these remarkable men prevailing through the rest of the century at Florence and elsewhere. From this period we date the great schism in modern art, though the seeds of this diversity of feeling and purpose were sown in the preceding century. We now find, on the one side, a race of painters who cultivated with astonishing success all the mental and mechanical aids that could be brought to bear on their profession; profoundly versed in the knowledge of the human form, studying and imitating the various effects of nature in colour and in light and shade, without any higher aspiration than the representation of beauty for its own sake, and the pleasure and the triumph of difficulties overcome: on the other hand, we find a race of painters to whom the cultivation of art was a sacred vocation, the representation of beauty a means, not an end, and by whom nature in her various aspects was studied and deeply studied, but only for the purpose of embodying whatever we can conceive of reverence as highest, holiest, purest in heaven and earth, in such forms as should best connect them with our intelligence and with our sympathies.

The two classes of painters who devoted their genius to these very diverse aims have long been distinguished in German and Italian criticism as the *Naturalists* and the *Idealists* or *Mystics*, and these denominations are now becoming familiarized in our own language. During the fifteenth century we find in the various schools of art scattered through Italy these different aims more or less apparent, sometimes approximating, sometimes diverging into extremes, but the distinction always apparent, and the influence exercised by those who pursued their art with such very different objects—with such very different feelings—was of course different in its result. Painting, however, during this century was still almost wholly devoted to ecclesiastical purposes; it deviated into the classical and secular in only two places, Florence and Padua.

In the convent of the Carmelites, where Masaccio has painted his famous frescoes, was a young monk, who, instead of employing himself in the holy offices, passed whole days and hours gazing on those works, and trying to imitate them. He was one whom poverty had driven, as a child, to take refuge there, and who had afterwards taken the habit from necessity rather than from inclination. His name was Filippo Lippi (which may be translated Philip the son of Philip), but he is known in the history of art as Fra Filippo (Friar Philip). In him, as in Masaccio, the bent of the genius was early decided; nature had made him a painter. He studied from morning to night the models he had before him; but restless, ardent, and abandoned to the pursuit of pleasure, he at length broke from the convent and escaped to Ancona. The rest of his life is a romance. On an excursion to sea he was taken by the African pirates, sold as a slave in Barbary, and remained in captivity eighteen months. With a piece of charcoal he drew his master's picture on a wall, and so excited his admiration, that he gave him his freedom, and dismissed him with presents. Fra Filippo then returned to Italy, and at Naples and at Rome gained so much celebrity by the beauty of his performances, that his crime as a runaway monk was overlooked, and, under the patronage of the Medici family, he ventured to return to Florence. There he painted a great number of admirable pictures, and was called upon to decorate many convents and churches in the neighbourhood. His life during all this time appears to have been most scandalous, even without consideration of his religious habit; and the sums of money he obtained by the practice of his art were squandered in profligate pleasures. Being called upon to paint a Madonna for the convent of St. Margaret at Prato, he persuaded the sisterhood to allow a beautiful novice, whose name was Lucretia Buti, to sit to him for a model. He carried her off from the convent, to the great scandal of the community and the inexpressible grief and horror of her father and family. Filippo was at this time nearly sixty, and but for his great fame and the powerful protection of the Medici he would have paid dearly for this offence against morals and religion. His friends Cosmo and Lorenzo de' Medici obtained from the pope a dispensation from his vows, to enable him to marry Lucretia; but he does not seem to have been in any haste to avail himself of it; the family of Lucretia, unable to obtain any public reparation for their dishonour, contrived to avenge it secretly, and Fra Filippo died poisoned, at the age of 69.

This libertine monk was undoubtedly a man of extraordinary genius, but his talent was degraded by his immorality: he adopted and carried on all the improvements of Masaccio, and was the first who invented that particular style of grandeur and breadth in the drawing of his figures, the grouping, and the contrast of light and shade, afterwards carried to such perfection by Andrea del Sarto. He was one of the earliest painters who introduced landscape backgrounds, painted with some feeling for the truth of nature; but the expression he gave to his personages, though always energetic, was often inappropriate, and never calm or elevated: in the representation of sacred incidents he was sometimes fantastic and sometimes vulgar; and he was the first who desecrated such subjects by introducing the portraits of women who happened to be the objects of his preference at the moment. There are many pictures by Fra Filippo in the churches at Florence; two in the gallery of the Academy there; five in the Berlin Museum; in the Louvre there is one undoubtedly genuine, and of great beauty, marked by all his characteristics: it represents the Madonna standing, and holding the Infant Saviour in her arms; on each side are angels and a kneeling monk. The attitude of the Virgin is grand; the head commonplace, or worse; the countenance of the Infant Christ, heavy; the angels, with crisped hair, have the faces of street urchins; the adoring monks are wonderful for the natural dignity of their figures and the fine expression in their upturned faces: the whole picture is admirably executed; it was painted for the church of the Santo Spirito at Florence, and is a celebrated production. The writer does not know of any picture by Fra Filippo now in England. He left a son, Filippo Lippi, called Filippino (to distinguish him from his father), who became in after years an excellent painter, and whose frescoes in the Chapel of the Brancacci emulated those of Masaccio.

[To be continued.]

ECONOMICAL USES OF THE OAK.

The useful purposes to which the Oak and its produce are applied are so numerous, that we could perhaps scarcely venture to say that we had enumerated them all, however industrious our search might be. In almost every department of the mechanical arts, in almost every kind of building, the produce of this noble tree is employed, rendering to man an incalculable amount of benefit. In enumerating some of the most prominent of these, it will be convenient to treat in succession of certain distinct species, since each one has some useful properties distinct from the others. We will avail ourselves of Mr. Loudon's classification of the Oaks into British Oaks, Turkey Oaks, White Oaks, Chestnut Oaks, Red Oaks, Black Oaks, Willow Oaks, Holly Oaks, Live Oaks, and Woolly-leaved Oaks; and will take, as our principal sources of information, such portions of his 'Arboretum Britannicum' as illustrate the practical uses of the oak in the arts.

Of oaks in general, Mr. Loudon says:—"They are trees of temperate climates, mostly of large size, and, in point of usefulness to man, only to be equalled by the pine and fir tribe. The latter may be considered the domestic, and the former the defensive, trees of civilized society, in the temperate regions throughout the world. The oak, both in Europe and America, is the most majestic of forest-trees. It has been represented by Marquis as holding the same rank among the plants of the temperate hemispheres, that the lion does among quadrupeds, and the eagle among birds: that is to say, it is the emblem of grandeur, strength, and duration; of force that resists, as the lion is of force that acts. In short, its bulk, its longevity, and the extraordinary strength and durability of its timber, attest its superiority over all other trees for buildings that are intended to be of great duration, and for the construction of ships. In one word, it is the king of forest-trees."

British Oak.—When we restrict ourselves, for a time, to this one species of the oak, we cannot fail to call to mind the numberless associations connected with the name "British Oak,"—national, mechanical, and agricultural. The oak-forests appear to have been formerly very numerous in Britain; and Professor Burnett gives the following curious exemplification of the manner in which we may consistently search for evidence of this fact. "For one Ash-ford, Beech-hill, Elm-hurst, or Poplar, we find a host of Oaks, Oakleys, Actons, Acklands, Akenhams, Acringtons, and so forth. The Saxon *ac*, *aec*, *aac*, and the later *ok*, *okes*, *oak*, have been most curiously and variously corrupted. Thus we find *ac*, *aec*, degenerating into *ak*, *ack*, *aike*, *acks*, whence *ax*, *exe*; often, also, aspirated into *hac*, *hace*, and *hacks*. In like manner we trace *oak*, *oke*, *ok*, *oc*, *ock*, *œck*, *ocke*, *oks*, *ocks*, *ockes*, running into

oar, ox, oxes, with their further corruptions *auck, uck, huck, hoke*, and *wok*. As an example of this last extreme, the town Oakingham, or Ockingham, is at this day called and spelt indifferently Oakingham, Okingham, or Wokingham; and Oaksey, or Oxessey, are two common ways of writing the name of one identical place. Oakham, Okeham, Ockham, and Wockham, Hokenorton on the river Oke, Woking in Surrey, Wacton in Herefordshire and Norfolk, Okey or Wokey in Somersetshire, Oakefield or Wokefield in Berkshire, and Old or Wold in Northamptonshire, with the provincial Whom or Whoam, are other similar corruptions."

The use of British oak as a timber-tree dates farther back than we have any means of determining. This timber is more durable, in every position in which it can be placed, than any other tree which abounds in large quantities in Europe. It is hard, tough, tolerably flexible, strong without being too heavy, not easy to splinter, and not readily penetrated by water. Some woods are harder, but they are more fragile; and others are more flexible, but do not possess so much toughness, hardness, and durability. In 1827 an experiment was made in the New Forest, Hampshire, with a piece of British oak, to determine its strength. It was reduced to the dimensions of five inches square, and eleven feet long, placed in two firm supports, exactly eleven feet apart, and it was found that four and three-quarter tons, three quarters, seventeen pounds, or more than ten thousand pounds, were required to break the beam. When the grain of oak is twisted, no timber is so well adapted for posts, either in house-building or in setting up mills, engines, or large machines. No wood lasts longer where it is subject to be alternately wet and dry; and oak piles have been known to endure many centuries. Shingles, pales, and laths last longer when made of this wood than of any other; and casks, and every other description of cooper's work, are most durable, and best adapted for containing wines, ales, and other liquors, when they are made of oak. Oak is extensively employed for the spokes of wheels, for which the small slow-growing variety of mountainous districts is preferred to the more rapid-growing and larger oak of the valleys. Oaks of from fifteen to thirty years' growth make the most durable poles. The young tree yields slender rods, well calculated for hoops, walking-sticks, and the handles of carters' whips.

The examples yet remaining of the use of British oak centuries ago, are very numerous. Professor Burnett possessed a piece of oak from King John's palace at Eltham, perfectly sound, fine, and strong, which can be traced back upwards of five hundred years. The doors of the inner chapels of Westminster Abbey are said to be coeval with the original building. The oaken shrine of Edward the Confessor is nearly eight hundred years old. One of the oaken coronation chairs in Westminster Abbey has been in its present situation more than five centuries. In Gloucester Cathedral there are thirty-one stalls of rich tabernacle-work on either side, executed of oak in the reign of Edward III., and beautifully perfect. In digging away the foundation of the old Savoy Palace, London, which was built nearly seven centuries ago, the whole of the piles, many of which were of oak, were found in a state of perfect soundness, as also was the planking which covered the pile-heads. Professor Burnett says:—"The piles which supported the buttresses and immense uncouth starlings which confined the water-way, and so greatly disfigured old London Bridge, were some of them of oak; and I have a specimen of one which is far from being in a rotten state; and the still older piles on which the bridge piers rested were also in a very strong and sound condition; nay, those stakes which it is said the ancient Britons drove into the bed of the Thames to impede the progress of Julius Cæsar, near Oatlands, in Surrey, some of which have been removed for examination, have withstood the destroyer Time for nearly two thousand years." In the 'Vetusta Monumenta' a description is given of a wooden church or chapel, near Ongar, in Essex, supposed to be nine hundred years old. The nave of this church is formed of the trunks of oaks, about eighteen inches in diameter, split through the middle, and roughly hewn at each end to let them into a sill at the bottom, and a plank at the top, where they are fastened by wooden pegs. The building is about thirty feet long, half as wide, and six in height to the bottom of the roof; and most of the oaks are still strong and sound.

In a maritime country like England, however, the use of oak in ship-building is perhaps more important than any of its other uses; and that it has been so employed from a remote period we have abundant evidence. Some years ago an ancient vessel was discovered in the river Rother, in Kent, which is supposed to have lain there since the time of Alfred: the wood, which was oak, was found to be perfectly sound, and nearly as hard as iron. The same may be said of two or three ancient vessels discovered in the drains or dyke of Lincolnshire, and of which one has been deposited in the British Museum. (See 'Penny Magazine,' No. 634.)

In the construction of the modern English navy the consumption of oak timber has been enormous, especially in time of war. There was a Report presented to government during the war, in which the extent of this consumption was calculated, in reference to a navy such as was possessed by England in 1806. The tonnage was taken at 776,087 tons, and it was stated that to build such a navy it would require 1,164,085 loads of timber. Supposing the average duration of a ship to be 14 years, the annual quantity of timber required would be 83,149 loads, exclusive of repairs, which were calculated to require 27,000 loads, making the whole about 110,000 loads. Three thousand loads of timber are required for a 74-gun ship; and the government ships were estimated to be equal in dimensions and quantity of timber to twenty seventy-fours built annually; that is, the amount of ship-building every year in the royal navy was equivalent to twenty 74-gun ships. Taking this as a datum, Mr. M'Culloch remarks:—"It has been supposed that not more than forty oak-trees can stand on an acre of ground, so as to grow to a full size, fit for ships of the line, or to contain each one load and a half of timber: 50 acres, therefore, would be required to produce a sufficient quantity of timber to build a 74-gun ship, and 1000 acres for 20 such ships; and as the oak requires at least 100 years to arrive at maturity, 100,000 acres would be required to keep up a successive supply for maintaining a navy of 700,000 or 800,000 tons." This state of things is, however, applicable only to such a warlike position as England was placed in at that time.

Specimens of British oak have occasionally been converted to useful purposes, presenting very extraordinary dimensions. Thus, one of the rooms in the house of Sir John Dryden, at Ashby Canons, thirty feet long and twenty feet wide, was entirely floored and wainscoted from a single oak. The same is said of a room in the mansion at Tredegar Park, measuring forty-two feet by twenty-seven. In the hall at Goodrich Castle, Herefordshire, there is a beam of oak, without a knot, sixty-six feet long, and two feet square throughout its whole length. Dr. Plot notices a table in Dudley Castle hall, cut out of a tree which grew in the park, all of one plank, above seventy-five feet long, and three feet wide throughout its whole extent; and which, being too long for the castle hall, had twenty-two feet cut from it. The mainmast of the Royal

Sovereign, built in the time of Charles I., was ninety-nine feet long, and three feet in diameter, formed out of one piece of oak. The accounts given of the dimensions of living trees are so numerous, and have been so often quoted, that we may pass them over.

Besides its use in ship-building and house-building, the wood of the oak is used for a variety of purposes. Evelyn says that of the root of the oak were formerly made handles to daggers and knives, tobacco-boxes, mathematical instruments, panels for pictures, and various minor articles. In the present day the wood of the oak, especially when distinguished for a more than usually elegant conformation of fibre, is frequently cut into veneers, and used for cabinet-work.

The leaves, gathered green and dried, furnish in some places a winter forage for sheep, goats, deer, &c. In more common purposes, the leaves, after they have dropped from the tree, are swept up, and used in gardening as a substitute for tanner's bark, in producing heat by fermentation in hothouses, beds, &c.

The acorns have in all ages been a very valuable part of the oak-tree. According to Evelyn, a peck of acorns a day, with a little bran, will make a hog increase a pound weight per day for two months together. In English parks, acorns form an important part of the winter food of deer; and were the tree substituted for the elm, the ash, and a number of others which are planted in hedge-rows, there would be a greatly increased supply of this kind of food throughout the country. Acorns are given raw or boiled to poultry; and it is said to be easy to accustom horses, cattle, and sheep to eat them. In one of the volumes of the 'Library of Entertaining Knowledge' ('Timber Trees') it is remarked:—'Whether the custom existed among the ancient Britons, or (as is more probable) was imported by the Saxons who came from the thick oak-forests of Germany, it is certain that, during the time when they held sway in this country, the fattening of hogs with acorns in the forests was accounted so important a branch of domestic economy, that at about the close of the seventh century King Ina enacted the *panage laws* for its regulation. The fruit of the oak then formed gifts to kings, and part of the dowries of queens. So very important was it, indeed, that the failure of the acorn crop was recorded as one of the principal causes of famine. One of the most vexatious acts of William the Conqueror, in his passion for converting the whole of the forests into hunting-grounds, was that of restricting the people from fattening their hogs; and this restriction was one of the grievances which King John was called upon to redress at the triumph of Runnimede, where his assembled subjects compelled him to sign the Magna Charta. It is to be observed that swine's flesh was the principal food of most nations in the earlier stages of civilization; and this is to be attributed to the extreme rapidity with which the hog species multiply. Up to a recent period, large droves of hogs were fattened upon the acorns of the New Forest in Hampshire, under the guidance of swineherds, who collected the herds together every night by the sound of a horn."

The bark of oak is a most valuable tanning ingredient. It is employed by English tanners more extensively than any other substance for this purpose; indeed, for a long time it was the only one employed by English tanners: but when the researches of Sir Humphry Davy and other chemists brought to light the nature of the vegetable principle which gives a tanning quality to oak-bark, other substances were found to contain the same principle. The manner in which the bark is stripped from the trees for the purposes of the tanner has been detailed in 'Penny Magazine,' No. 181. There are no means of knowing the quantity of bark used every year in the kingdom, but it must be enormous; for besides the vast (but unrecorded) supply furnished by the oaks growing in England, there are forty thousand tons of oak-bark imported yearly from abroad. Every part of the oak abounds in astringent matter; and even the leaves and sawdust will tan leather, linen-cloth, netting, or cordage, which is to be much exposed to the weather. The Highlanders dye their yarn of a brown colour with oak-bark; and in many other countries it is used for dyeing as well as for tanning.

[To be continued.]

Singapore Harbour.—At day-dawn, when the sky receives its first bright tints from the rising sun, and the morning mist yet shrouds the marshes and hangs about the damp verdure, the harbour is alive with boats and resounding with the noisy hum of awakened crowds; the long low canoe of the Malay, propelled by twenty or thirty paddles, each stroke accompanied by their peculiar cry; punts, the undoubted progeny of the mother junks, conveying to the shore the Chinese mariner with his fan and umbrella; the sampans, with their clean matted seats and plantain-leaf awnings, waiting for passengers, and promiscuously manned by the Hindoo, the Moor, the Malay, or the Arab, the wild native of Borneo or Amboyna, Madura, or the more independent and manly inhabitant of Bali; the unwieldy junk herself, with painted eyes, which are presumed to guide it in safety clear of shoals and danger, its large masts without rigging, mat-sail, high-peaked stern (not unlike ours of the fifteenth century) bedaubed with flying dragons, painted devils, and proverbs, and the poop entirely occupied by the indispensable jos, disgorging scores of chattering Chinese; boats laden with fruit of every description, amongst which pine-apples predominate, arriving from distant creeks, ready for the morning market, and the light fishing-canoe, with its patient occupant, who will sit for hours under the shade of his light grass-hat, are amongst the many novelties that attract the attention of the stranger.—*Capt. G. G. Loch's Closing Events of the Campaign in China.*

Emigration.—Why should there not be an "Emigration Service" and Secretary, with adjuncts, with funds, forces, idle navy ships, and ever increasing apparatus; in fine, an *effective system* of emigration; so that at length, before our twenty years of respite ended, every honest, willing workman, who found England too strait, and the organization of labour not yet sufficiently advanced, might find likewise a bridge built to carry him into new western lands, there to "organize," with more elbow-room, some labour for himself? There to be a real blessing, raising new corn for us, purchasing new webs and hatchets from us; leaving us at least in peace; instead of staying here to be a physical-force Chartist, unblessed and no blessing! Is it not scandalous to consider that a prime minister could raise within the year, as I have seen it done, a hundred and twenty millions sterling to shoot the French; and we are stopt short for want of the hundredth part of that, to keep the English living? The bodies of the English living; and the souls of the English living:—these two "services," an education service and an emigration service—these, with others, will actually have to be organized! A free bridge for emigrants: why, we should then be on a par with America itself, the most favoured of all lands that have no government; and we should have, besides, so many traditions and mementoes of priceless things which America has cast away. We could proceed deliberately to "organize labour," not doomed to perish unless we effected it within year and day; every willing worker that proved superfluous finding a bridge ready for him. This verily will have to be done; the time is big with this. Our little isle is growing too narrow for us; but the world is wide enough yet for another six thousand years. England's sure markets will be among new colonies of Englishmen in all quarters of the globe. All men trade with all men, when mutually convenient, and are even bound to do so by the Maker of men. Our friends of China, who guiltily refused to trade, in these circumstances, had we not to argue with them, in cannon-shot at last, and convince them that they ought to trade! "Hostile Tariffs" will arise to shut us out, and then again will fall to let us in; but the sons of England, speakers of the English language, were it nothing more, will in all times have the ineradicable predisposition to trade with England.—*Past and Present, by Thomas Carlyle.*



PIGS AND PIG-DROVERS.

Ireland should be—one would think—a sort of paradise for pigs, for there this useful animal is treated with a degree of respect unknown to his brethren in England: though his creature comforts may be greater, but then his English owner looks rather to his table as the animal's final destination, while the more disinterested Irish proprietor, generally speaking, has no such sordid considerations, for seldom does a bit of the flitch find its way into his pot. English ideas of comfort are very comprehensive, and many persons like the late Mr. Cobbett would scarcely let their pigs lodge in a less comfortable manner than they themselves could put up with 'on a pinch.' In Ireland the pig is a joint tenant and fellow lodger with the peasant, feeding almost at the same board with him; and these privileges are most cheerfully and gratefully conceded. 'Sure, and doesn't he pay the rent?' is the exclamation nearly all over Ireland. The English traveller may look with distaste at the arrangement which subsists between pig and proprietor; but soon he finds that a landholder might as well be without title-deeds as the holder of a patch of land without a grunting tenant to divide the cabin with him. Mr. Inglis, in his 'Journey throughout Ireland,' remarks:—"I used to be shocked at seeing a pig's snout at a cabin door, and looked at such a spectacle as a proof of wretchedness; but now I began to bless the sight, and to pity more the poor wretches who possessed no pig. It is true, indeed, that things were still better when a pig-sty was visible, for that gave evidence both of the existence of the pig and of the superior comfort of its owner; but still it was always to me a pleasant sight where, if no pig-sty was visible, I saw him 'that pays the rent' walk leisurely in and out of the cabin door, or heard his comfortable grunt within. The greatest example of individual prosperity I perceived among the poor in the neighbourhood of Thomastown was finding three pigs resident in one cabin." The Reports of the Assistant Commissioners under the Irish Poor Law Inquiry abound with facts showing the very great importance and value attached to the possession of a pig by the peasantry, and the attention which they pay him. One extract will be sufficient:—"Whatever may be the poverty and privations of the labourer and his family, the pig is almost always sure to be coddled up with a good warm dinner and a snug corner in the cabin; and the Assistant Commissioners have more than once been puzzled to decide whether his or the children's bed was composed of the cleanest and the largest quantity of straw. The great importance of this animal to the labourer and smallest occupier (their only means in almost all cases of paying their rent) is quite sufficient to account for the care and anxiety which are evinced to promote his thriving." (*Appendix F, Poor Inquiry*, p. 385.)

A very large proportion of the pigs reared in Ireland find their way either alive or cured into the English market. Irish rents could not be paid but for English prices; and therefore the Irish peasant and small or large farmer must dispose of his live-stock for exportation to England, they themselves enjoying but a small portion of the fruits of their care and labour, as the bulk is absorbed in payment of rent. As nearly every head of a family amongst the rural population endeavours to obtain land as the surest resource against starvation, the agricultural exports must of course be very large. Between 1825 and 1835 they rose in value from 9,243,823*l.* to 16,693,685*l.*, being an increase of 7,450,475*l.* a year, in the short space of ten years. This has been almost entirely the effect of steam navigation

which has wonderfully facilitated the means of access to the English market from Ireland, and at the same time increased the power of paying a high rent. Take pigs only, a great source of rent, as already shown; and in 1801 there were not two thousand imported from Ireland into all the ports of Great Britain; and in the following years as under:—

1805.	1809.	1813.	1817.	1821
6383	4712	14,521	24,193	104,501

In 1821 steam-navigation was in its infancy, but it was already beginning to tell on the export trade in live-stock. In 1837 its powers had increased to such an extent, that the number of pigs brought alive from Ireland into the port of Liverpool only was 595,422, of the average value of fifty shillings, making a gross sum of 1,488,555*l*. (Porter's *Progress of the Nation*, vol. ii., p. 82.) If we add the imports into Bristol, the number of pigs will probably be 700,000, and their aggregate value 1,750,000*l*. There are no means of ascertaining the imports at the other ports of Great Britain, as, since 1825, the trade between the two countries has been assimilated to a coasting-trade, and, except for corn and grain, no official returns are required to be kept. At the same time the export of bacon and hams, from 1825 to 1835, did not decrease, but it cannot be ascertained whether the quantity of pork exported fell off, though it probably did. The export trade in pigs is very active at all the eastern ports of Ireland. It is probable that more than six-eighths of the total number received in Great Britain are imported at Liverpool. The cost of conveyance from Dublin to Liverpool is from one shilling and sixpence to four shillings per head, according to size; and from Drogheda to Liverpool from one to three shillings. On reaching Liverpool they are generally conveyed to Manchester by a railway waggon, the weight carried being from forty-five to fifty cwt. The weight of the pigs varies from half a cwt. to two cwt., and the charge is about twenty-five shillings per waggon between the two towns. From Manchester the animals are conveyed by railways farther into the interior. In a provincial paper we read the other day the following paragraph, which shows that the English country-dealers find it answer their purpose to attend the pig-market at Liverpool:—"Early on Tuesday morning a number of excellent bacon pigs were to be seen slaughtered in the shop of Mr. Barlow, Shamble-street, Barnsley, which were at Liverpool, above one hundred miles from that place, on Monday afternoon, at five o'clock. This extraordinary piece of work was done by Mr. Thomas Fleetwood, pig-dealer, who left the Royal Oak Inn, Barnsley, at a quarter past five o'clock on Sunday afternoon, and consequently travelled upwards of two hundred miles in thirty-eight hours, and drove the pigs above six miles to and from the railway stations." (*Doncaster Gazette*.) The trade of a pork-butcher was comparatively unknown twenty years ago, even in many towns of large size; but it has been gradually increasing in extent and importance. It is, of course, quite a distinct calling from that of the dealer in bacon and hams. The Irish bacon is not of such good quality as that fed in England, as the animal is generally fattened on potatoes only, while the best practice here is, when half fat, to finish off with pease-meal or barley-meal. The agricultural labourers, in counties where their condition is most comfortable, know that it is most profitable to buy the higher-priced English bacon, which swells in the boiling, and is at once more palatable and substantial than the potato-fed bacon of Ireland. In order to obtain the advantages of the English market, great improvements have taken place in the breed of pigs kept in Ireland. "The breed has been quite changed within a few years, and is now excellent. The increase in the export of pigs from Ireland is more striking than that of any other article of produce, and to that degree have the tillage-farmers profited by steam navigation." (Lord Clement's *Pamphlet on Ireland*, 1838.) This improvement is frequently adverted to in the Reports under the Poor Inquiry Commission.

The subject of the cut brings us to a consideration of the pig-trade in Ireland itself. The amount of bargaining and dealing involved in the transfer of Irish pigs from their owners to the butcher and curer is far greater than is occasioned by the sale in a similar way of ten times the number of sheep; for in one case pretty nearly every pig has a separate owner, while each flock-master has a number of sheep for sale at the same time. The number of pig-jobbers and pig-drovers in Ireland is, of course, very large. The dealing is exactly of a description adapted to the commercial character of the Irish of a particular class. There is scope here for fun, 'blarney,' and cunning, and many a rich scene takes place before a bargain is struck. Mr. Inglis gives a specimen of the mode of proceeding in the market-place of Cashel:—"A man, a pig-dealer, would come to a countryman who held a pig by a string: 'How much do you ask?' 'Twenty-eight shillings,' the answer might be. 'Hold out your hand,' says the buyer; and the proprietor of the pig holds out his hand accordingly: the buyer places a penny in it, and then strikes it with a force that might break the back of an ox. 'Will ye take twenty shillings?' The other shakes his head. 'Ask twenty-four, and see if I'll give it ye,' says the pig-merchant. The owner again shakes his head. It is probable that by this time some one among the bystanders—for there is always a circle formed round a bargain making—endeavours to accommodate matters, for it is another instance of the kindly feeling towards each other, that all around are anxious that the bargain should be concluded. Again the merchant says, 'Hold out your hand,' and again a tremendous blow is struck, and a new offer made, till at last they come within a shilling, perhaps, of each other's terms, when the bargain is struck; and the shilling about which they differed, and probably two or three others, are spent in whiskey-punch 'screeching hot.'" The pigs are then most probably either driven to the shipping port or to the large curing establishments, or, perhaps, sold to those who fatten and cure, but do not breed pigs.

SUBSTITUTES FOR COAL.

WITHIN the last few years a surprising number of new projects have been brought under the notice of the public, having for their object the preparation of a *fuel* which shall be either cheaper or better, or both, than coal. The high price of the latter fuel, together with a rapidly increasing desire to lessen the nuisance of smoke, have probably been the chief reasons which have led to these projects; and it is not improbable that much good may be wrought by this movement. Indeed, some of the kinds of fuel introduced have already met with much approval from engineers and others. Generally speaking, small coal from the pit's mouth, and various bituminous and oily substances, ashes, dust, and peat, are the ingredients, one or more of which constitute the artificial fuel. A brief notice of a few of these may be here given, sufficient to show their general character.

An artificial fuel, introduced by Mr. Oram, has for its basis the hitherto neglected small coal, which is accumulated at the mouths of the coal-pits, and which has been so very extensively turned to waste. At the meeting of the British Association at Newcastle, Professor Buckland stated that he, in common with many

others, lamented the loss of the thousands of tons of small coal which were burned to waste at the pits' mouths; and after adverting to the fact that he had called attention to the matter in his 'Bridgewater Treatise,' he expressed his gratification that a mode had been devised of uniting the particles of this small coal into masses, and forming thereby a valuable fuel. He stated that he had used the new fuel side by side with the best Newcastle coal, and found it equal both in light and heat. Mr. Buddle, the eminent coal-viewer, afterwards stated that the amount of small coal which is uselessly buried at the bottom of the mines is incalculably greater than that which is burned at the surface, and he expressed his hope that an efficient means of using this coal would be practically adopted.

M. Oram's specification of the method of making this artificial fuel is very minute; but the following are the most material points:—Besides the small coal, he uses mud, alluvial deposits, marl, clay, or any other earth containing vegetable matter; together with any one or more of the bituminous substances, such as mineral-tar, coal-tar, gas-tar, mineral pitch, vegetable pitch, resin, asphaltum; or saw-dust, coke-dust, and breeze. Among these various ingredients many selections may be made. For instance: one kind of the artificial fuel consists of ten cwts. of coal-dust, an equal weight of coke-dust, thirty pounds of tar, two hundred pounds of any dry mud, a marl containing vegetable matter, thirty pounds of lime, and fifty gallons of water. Another kind contains fifteen cwts. of coal-dust, five cwts. of saw-dust, forty pounds of any kind of tar, two hundred pounds of earthy matter, thirty pounds of lime or chalk, and seventy gallons of water. A third kind varies the composition thus: five cwts. of peat-earth, five cwts. of saw-dust, ten cwts. of coal-dust, thirty pounds of lime, thirty pounds of tar or other kinds of bitumen, two hundred pounds of dry earth, and seventy gallons of water. Mr. Oram gives six or seven various mixtures to illustrate the manner in which the selection may be made according to the materials furnished in the locality.

In combining these ingredients, the bituminous substances, if liquid, such as gas-tar, are used cold; but if solid, such as mineral pitch, they are melted and mixed while hot with the other materials. The bituminous matter, the earths containing vegetable matter, and the water, are stirred up together, and to them are added the coal-dust, the pounded lime, or the other ingredients, and the whole are well amalgamated by machinery. The mixture is then pressed in a mould to any desired form; and the bricks, if we may apply that name to the masses thus formed, are left to dry.

Mr. C. W. Williams, the managing director of the Dublin Steam-Packet Company, has, within the last few years, taken out two or three patents for the manufacture of fuel, in which the employment of peat is more prominently brought forward than in Mr. Oram's plan. In Mr. Williams's first patent, taken out in 1837, he describes the mode of compressing the water out of peat-moss, of mixing it with powdered limestone or sand, and of breaking asunder or destroying the vegetable formations and fibrous texture of the peat-bog by the use of iron rollers. The peat-moss or bog-earth is, in the first instance, stratified, or placed in alternate layers, with some absorbent material which will assist in extracting the water from it. This absorbent or recipient may be a layer of sand confined in sacking, or sand without an envelope, or textile materials, or any others that may be found efficacious. The layers of peat are made very thin, and several of them alternate with layers of the recipient or absorbent; and the whole are then compressed either by the usual screw-press or the hydraulic-press. A peculiar mode is adopted, by compressing the peat with cylinders perforated with holes, of breaking up the fibrous texture, and enabling the peat to combine more intimately with the sand, powdered lime, or small coal added to it.

By a subsequent patent, Mr. Williams introduced bituminous substances into his artificial fuel; and he treats peat-moss in such a manner as to produce four different kinds of fuel from it, viz.: a brown combustible solid, denser than oak; a charcoal, twice as compact as hard wood charcoal; an artificial coal; and an artificial coke. Dr. Ure describes the mode of procuring the turf charcoal, thus:—Immediately after being dug, the peat is triturated under revolving edge-wheels, faced with iron plates perforated all over their surface, and is forced by the pressure through these apertures, till it becomes a species of pap, which is freed from the greater part of its moisture by squeezing in a hydraulic press between layers of caya cloth, then dried, and converted into a kind of charcoal in a coking-oven. The artificial coal is made from this charcoal by first grinding the charcoal to powder, and mixing with it as much melted pitch or resin as will convert the whole into a doughy mass; and this mass is then moulded into bricks in its hot and plastic state. In relation to the economical uses of these compositions, Dr. Ure remarks:—"Mr. D'Ernst, artificer of fire-works to Vauxhall, has proved, by the severe test of coloured fires, that the turf-charcoal of Mr. Williams is twenty per cent. more combustible than that of oak. Mr. Oldham, engineer of the Bank of England, has applied it in softening his steel-plates and dies with remarkable success. But one of the most important results of Mr. Williams's invention is, that with ten cwts. of pit-coal and two cwts. and a half of his factitious coal, the same steam-power is now obtained in navigating the Company's ships as with seventeen cwts. and a half of pit-coal alone, thereby saving thirty per cent. in the stowage of fuel. What a prospect is thus opened up of turning to admirable account the unprofitable bogs of Ireland, and of producing from their inexhaustible stores a superior fuel for every purpose of arts and engineering." (*Dict. of Arts.*)

Peat is in most cases one of the ingredients employed in the preparation of the modern artificial fuels. Thus, a Major André Weschniakoff, of Russia, has taken out a patent for a mixture of coal, charcoal, coke, or peat, reduced to powder, with animal or vegetable oil, and clay or loam. Mr. Mohun, in the specification of his patent, describes a mixture of peat, slimy mud containing vegetable matter, nitre, alum, linseed, resin, coke, green vegetable matter, and various kinds of refuse, which are all mixed together, and pressed into brick-shaped masses. In another patent the same inventor added bituminous matters to the other ingredients. In some few instances these "patent fuels"—which, it must be confessed, often present such a strong family likeness that it is difficult to tell which among them can really be called new—are formed without peat. Thus, one patent is for a mixture of bituminous schist, aluminous clay, mineral oil, pulverized coal, and vegetable or mineral gelatine, combined together while hot, and poured out in a stratum on a cold slab. Another is for a mixture of tar and coal-dust, formed into bricks. A third differs from the second in having liquid clay added to the tar and coal; the aqueous part being afterwards driven off by the heat of an oven. A fourth patent relates to the use of fuller's-earth, clay, loam, or mud, with tar, pounded coal, and road dust. Another gives, as an artificial fuel, a mixture of sea-coal, clay, sand, alluvial deposits, tar, and water. Such are a few of the recent propositions in respect to this matter.

In Ireland and Scotland, and other countries where

peat-bogs exist, it is important to bring the peat into a state for fuel without admixture with any other substance, and hence much attention has been paid to this matter. In Holland, where the peat cannot be dug out of the solid mass but is brought up in the form of mud from a considerable depth under water, the following plan is adopted:—After the liquid peat has been raised by means of small strong nets fixed to a long pole, it is carried in boats to a place prepared for the purpose, which is flat and level. The liquid peat is spread over the ground to a depth of six inches, and the water is allowed to drain off slowly. When the peat begins to dry, men fix boards to their feet and walk over it so as to compress it, and as soon as it will bear cutting, it is cut with a spade made, on purpose, into oblong pieces, measuring eight or nine inches by five. When completely solid, these peats, which by treading and drying have been reduced to a thickness of four or five inches, are set on edge, and afterwards stacked loosely, so that the air may pass through them, in a shed covered by a roof to protect them from the rain. They soon become hard, and burn more like wood or coal than the peat which is cut immediately from the solid mass. They give out great heat, and form a fuel which, when it is shut up in a close vessel to stop the combustion, and allowed to cool, has a considerable resemblance to charcoal.

The common mode of collecting and cutting the stiffer peat turf or bog of our own isles is thus:—The instrument used is the turf-spade, about four feet in length and four inches in breadth, having an edge turned up on one side for the purpose of cutting the turf into pieces while being sliced from off the substratum. The ground being first marked out on the surface in a straight line of any convenient length, and three or four feet in width, the surface is brought level by means of a common spade, and the turf-cutter, taking his station at one end or side, proceeds to slice off the turf, which is separated into oblong strips by means of the edge to the spade. The peat or pieces thus procured are first laid on the ground to get partially dry, and then piled up in open heaps until dry enough [illegible].

Some of the public journals, three or four years ago, gave some interesting details respecting the means adopted by Lord Willoughby to render peat more available as fuel. During a frequent residence in the mountainous districts of Scotland and Wales, where the inhabitants depend chiefly upon peat for their fuel, his lordship had given much attention to the manner of preparing it for use. From observing the impossibility of rendering it available in a wet season for domestic purposes, he was induced to enter upon a series of experiments on its compression by machinery. The first of these took place in 1834. The machine employed was a powerful screw-press, so adjusted that two men could produce with it a pressure of a hundred tons. A hollow receptacle in the press was charged with about seven cubical feet of wet peat, and the pressure being then applied, all the moisture was expelled from the peat through small holes in the containing vessel. In another machine a different form of receptacle was adopted to prevent the exudation of the peat itself through the small holes which were intended for the exit of the water, and this was further aided by wrapping the peat in linen cloth. As the method was expensive, and rather slow, his lordship made a further trial. He contrived an arrangement in which a piston descended upon the wet peat, beneath which was a layer of linen cloth and another of hair cloth, and the water thus found its way through without allowing any of the peat to pass. Step by step Lord Willoughby proceeded until he produced a machine which he deemed useful enough to secure by a patent, at the same time giving permission to any one, on proper application, to use such a machine gratuitously. In the selection of the peat for compression care is taken that it is a black peat free from fibre, and presenting somewhat the appearance of blackened butter. The peat is dug in pieces eight inches long, three wide, and three deep, since all attempts to compress the water from larger masses have failed. Before compression, the peats are placed to dry for five or six days under sheds, in the same manner as bricks and tiles, and after compression they remain under cover until perfectly free from moisture, when they are fit for use. The peat, when properly compressed, is reduced about one-third in size, hard and compact, and nearly black in colour. It has been found an excellent substitute for coal, both in domestic fireplaces and in manufactories. It has been used in calcining lime and in steam-engine furnaces. When charred in a close oven it produces such admirable charcoal that some cutlers have used it in forging razors and surgical instruments, and have stamped their goods with the inscription, 'forged with peat,' as a test of quality.

True Politeness.—Lord Chatham, [illegible] remarkable [illegible] spirit [illegible] defined good breeding, "Benevolence in trifles, or the preference of others to ourselves in the little daily occurrences of life."—*Sharp's Letters and Essays.*

[illegible]—At that hour, when [illegible] luminary [illegible] with [illegible] that spread around [illegible] sight—I generally ascended the Mirador [illegible] from those upper regions, the calm beauty of the [illegible] and to contemplate the unclouded [illegible] of the west in sky reflected upon the crisped bosom of the ocean, and steeped [illegible] which would defy the powers of a Claude to transfer to canvas. The [illegible] little watch-towers [illegible] down upon a vast [illegible] of flat-terraced [illegible] white the walls they surmount, and in many [illegible] flowers, which gradually became animated by the [illegible] some of the dwellers [illegible] ing the [illegible] shut [illegible] children at [illegible] amongst themselves, [illegible] consequence is that, [illegible] fixed upon them, while from the streets [illegible] those who at that hour [illegible] their steps towards the Alameda and the Plaza de la Constitucion. But that which has the most amused me in the [illegible] which the roofs of Cadiz exhibit at sunset [illegible] shooting jacket and gaiters, with powder-flask [illegible] who actually takes the diversion of [illegible] of his terrace with all the [illegible] [illegible] N[illegible] dog regularly beats about the [illegible] sparrow or a swallow, and his master [illegible] and although literally [illegible] and that, even should he hit his bird, it [illegible] street, or upon some neighbouring roof, he appears to be as much delighted as though he brought down the finest pheasant that ever whizzed out of a brake—whistles his dog to him, makes much of him, and recommences. That [illegible] sportsman should like to shoot at sparrows upon the house-top is quite intelligible, but the accompaniment of the pointer is one of the solemn absurdities that defy calculation. It reminds me of the seamanship of some of our Thames yachting [illegible] although they have never screwed up their courage to the [illegible] ing point of venturing into blue water, never go on a whitebait excursion to Greenwich or Blackwall without ordering close-reefed top-sails and a storm-jib to be got ready, in order to meet the contingent perils of their cruise.—*Mrs. Romer's Summer Ramble in 1842.*



[Coronation of the Virgin, and Portrait of A. da Fiesole.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XIII.

[Continued from page 274.]

Angelico da Fiesole.

Contemporary with Fra Filippo, or rather earlier in point of date, lived another painter-monk, presenting in his life and character the strongest possible contrast to the former—a man who, as Vasari tells us, might have lived a very agreeable life in the world, had he not, impelled by a sincere and fervent spirit of devotion, retired from it at the age of twenty to bury himself within the walls of a cloister; a man, with whom the practice of a beautiful art was thenceforth a hymn of praise, and every creation of his pencil an act of piety and charity, and who, in seeking only the glory of God, earned an immortal glory among men. This was Fra Giovanni Angelico da Fiesole, whose name, before he entered the convent, was Guido Petri de Mugello.* He has since obtained, from the holiness of his life, the title of *Il Beato*, "the Blessed," by which he is often mentioned in Italian histories of art. He was born in 1387, at Fiesole, a beautiful town situated on a hill overlooking Florence; and in 1407, being then twenty, and already skilled in the art of painting, particularly miniature illuminations, he entered the Dominican convent of St. Mark at Florence, and took the habit of the order

* Notes to the last Florence edition of Vasari, p. 303.

It is not known exactly under whom he studied, but he is said to have been taught by Starnina, the best colourist of that time. The rest of his long life of seventy years presents only one unbroken tranquil stream of placid contentment and pious labours. Except on one occasion, when called to Rome by Pope Nicholas V. to paint in the Vatican, he never left his convent, and then only yielded to the express command of the pontiff. While he was at Rome, the Archbishopric of Florence became vacant, and the pope, struck by the virtue and learning of Angelico, and the simplicity and sanctity of his life, offered to install him in that dignity, one of the greatest in the power of the papal see to bestow. Angelico refused it from excess of modesty, pointing out at the same time to the notice of the pope a brother of his convent as much more worthy of the honour, and by his active talents more fitted for the office. The pope listened to his recommendation; Frate Antonino was raised to the see, and became celebrated as the best Archbishop of Florence that had been known for two centuries. Meantime Angelico pursued his vocation in the still precincts of his quiet monastery, and being as assiduous as he was devout, he painted a great number of pictures, some in distemper and on a small scale, to which he gave all the delicacy and finish of miniature; and in the churches of Florence many large frescoes with numerous figures nearly life size, as full of grandeur as of beauty. He painted only sacred subjects, and never for money. Those who wished for any work of his hand were obliged to apply to the prior of the convent, from whom Angelico received with humility the order or the permission to execute it, and thus the brotherhood was at once enriched by his talent and edified by his virtue. To Angelico the art of painting a picture devoted to religious purposes was an act of religion, for which he prepared himself by fasting and prayer, imploring on bended knees the benediction of heaven on his work: he then, under the impression that he had obtained the blessing he sought, and glowing with what might truly be called inspiration, took up his pencil, and mingling with his earnest and pious humility a singular species of self-uplifted enthusiasm, he could never be persuaded to alter his first draught or composition, believing that which he had done was according to the will of God, and could not be changed for the better by any after-thought of his own or suggestion from others. All the works left by Angelico are in harmony with this gentle, devout, enthusiastic spirit. They are not remarkable for the usual merits of the Florentine school: they are not addressed to the taste of connoisseurs, but to the faith of worshippers. Correct drawing of the human figure could not be expected from one who regarded the exhibition of the undraped form as a sin; in the learned distribution of light and shade, in the careful imitation of nature in the details, and in variety of expression, many of his contemporaries excelled him; but none approached him in that poetical and religious fervour which he threw into his heads of saints and Madonnas. Power is not the characteristic of Angelico; wherever he has had to express energy of action, or bad or angry passions, he has generally failed. In his pictures of the Crucifixion, and the Stoning of St. Stephen, the executioners and the rabble are feeble and often ill-drawn, and his fallen angels and devils are anything but devilish; while, on the other hand, the pathos of suffering, of pity, of divine resignation—the expression of extatic faith and hope, or serene contemplation, have never been placed before us as in his pictures. In the heads of his young angels, in the purity and beatitude of his female saints, he has never been excelled—not even by Raphael.

The principal works of Angelico are the frescoes in the church of his own convent of St. Mark at Florence, in the church of Santa Maria Novella, and at Rome in the chapel of Nicholas V., in the Vatican. His small easel pictures are numerous, and to be found in most of the foreign collections, though unhappily the writer can point out none that are accessible in England. There is one in the Louvre, of surpassing beauty, the upper part of which is represented in the wood-cut at the head of this essay. The subject has already been alluded to (No. 694, p. 26) as a favourite one with the early painters, the Coronation of the Virgin Mary by her son the Redeemer, in the presence of saints and angels. It represents a throne under a rich Gothic canopy, to which there is an ascent by nine steps; on the highest kneels the Virgin, veiled, her hands crossed on her bosom. She is clothed in a red tunic, a blue robe over it, and a royal mantle with a rich border flowing down behind. The features are most delicately lovely, and the expression of the face full of humility and adoration. Christ, seated on the throne, bends forward, and is in the act of placing the crown on her head; on each side are twelve angels, who are playing a heavenly concert with guitars, tambourines, trumpets, viols, and other musical instruments; lower than these, on each side, are forty holy personages of the Old and New Testament; and at the foot of the throne kneel several saints, male and female, among them St. Catherine, St. Agnes, and St. Cecilia, crowned with flowers. Beneath the principal picture there is a row of seven small ones, forming a border, and representing various incidents in the life of St. Dominic. The whole measures about seven and a half feet high by six feet in width. It is painted in distemper; the glories round the heads of the sacred personages are in gold; the colours are the most delicate and vivid imaginable; and the ample draperies have the long folds which recall the school of Giotto; the gaiety and harmony of the tints, the expression of the various heads, the divine rapture of the angels with their air of immortal youth, and the devout reverence of the other personages, the unspeakable serenity and beauty of the whole composition, render this picture worthy of the celebrity it has enjoyed for more than four centuries. It was painted by Frate Angelico for the church of St. Dominic at Fiesole, where it remained till the beginning of the present century. How obtained it does not appear, but it was purchased by the French government in 1812, and exhibited for the first time in the long gallery of the Louvre in 1815; it is now placed in the gallery of drawings at the upper end. A very good set of outlines were engraved and published at Paris, with explanatory notes by A. W. Schlegel; and to those who have no opportunity of seeing the original, these would convey some faint idea of the composition, and of the exquisite and benign beauty of the angelic heads.

Fra Giovanni Angelico da Fiesole died at Rome, in 1455, and is buried there in the church of Santa Maria sopra Minerva.

It is a curious circumstance that the key of the chapel of Pope Nicholas V., in which Angelico painted some of his most beautiful frescoes, was for two centuries lost, and few persons were aware of their existence, fewer still set any value on them. In 1769 those who wished to see them were obliged to enter by a window.

LAKES.

Lakes are in the land what islands are in the sea; they are surrounded on all sides by land, as islands are by water. They are sheets of water of greater or less extent, and differ from lagoons in their origin, and from tanks and reservoirs by their being naturally

formed, whereas the latter are the works of man. From ponds and pools it is not so easy to distinguish them, it being difficult to draw the line between a large pond and a small lake. The feature by which, perhaps, they would be best distinguished is this, that a lake is fed by streams either flowing at the surface of the soil or subterraneous; while a pond, though large, is only the accumulation of rain-water in some hollow. Thus ponds are usually dried up in hot weather, while true lakes are only temporarily diminished by heat.

Lakes have sometimes been divided into fresh-water lakes and salt-water lakes; though here again it is not easy to draw the line between the two, as from the freshest to the most salt the degrees of saltness are very various.

The principal difference in lakes is this: some have no apparent affluents nor outlet, others have affluents without any visible outlet; some have an outlet without any visible affluents, and others again have both affluents and an outlet.

Lakes without apparent affluents or outlets are comparatively small, and yet they are, relatively speaking, more permanent than larger lakes, because, being fed chiefly by subterraneous springs, they are not liable to be filled by those deposits of earth and sand which are the main cause of the rapid desiccation of such lakes as receive the troubled waters of torrents and rivers. If we follow the usual custom, and call all natural sheets of water lakes, then there are many lakes without affluents or outlet. Thus they are very numerous to the northward of the Caspian and in the plains which extend between the Ural Mountains and the Irtish, as also in the great steppe of Baraba, between the Irtish and the Ob. But in truth the greater part of these are more properly ponds, formed of the accumulated waters from rain and melted snow. The largest of them are not more than ten or twelve miles in circumference and six or seven feet deep; indeed, many of them are quite dried up towards the end of summer. Some are salt, and yield considerable profit. Their saltness is not easily accounted for; the more particularly as among and close to those that are salt there are many whose waters are quite fresh. The opinions of naturalists on the subject of salt lakes are very various, and no satisfactory theory has, perhaps, yet been offered. Small lakes of the kind of which we have been speaking, that is to say, such as have neither affluents nor outlet, sometimes occur in hollows resembling the craters of extinct volcanoes. We say resembling, because, although Dolomieu, Spallanzani, and others maintain the existence of lakes in such craters, M. Desmarest, upon apparently very good reasons, absolutely denies the possibility of lakes existing in the craters of extinct volcanoes. The celebrated Lake of Averno is, according to Ferber and Breislak, situated in an antient crater.

Of lakes which receive affluents without having any visible outlet, the largest is the Caspian. The Aral and the Dead Sea, or Lake Asphaltites, are also examples of this kind of lake, which is very common in Asia. Some of them are of vast extent; such, for instance, is the lake Terkiri in Tibet, twenty-seven leagues long and nine leagues wide, and the lake Hoho-nor, or Koko-nor, in the same country, whose surface is two hundred and forty square leagues. It was at one time thought that the saltness of certain lakes was due to the circumstance of their receiving the saline impurities of their affluents, which impurities could not escape for want of an outlet: but, on the one hand, the Durrah in Segistan, which receives the Helmund and has no outlet, is perfectly fresh; and, on the other, there are many salt lakes which have no affluents: hence the saltness of lakes must have some other cause. The question has sometimes been asked, what becomes of the excess of water brought into lakes having no outlet? Halley thought evaporation was all-sufficient to carry it off, and his opinion is highly plausible. If, however, it shall be found, by actual experiment, that a greater quantity of water is brought into a lake, without apparent issue, than can be carried off by evaporation, the natural conclusion will be that the surplus is lost by infiltration or subaqueous drainage. Several of these lakes have formerly had outlets, but water has ceased to flow from them, because the lakes have sunk in consequence of receiving now a much smaller quantity of water than formerly. There are many lakes in Europe at the present day whose outlets are diminishing; such, among others, are the lakes Balaton and Neusiedel in Hungary. The extent of surface of the former is very great compared with the quantity of water which it receives, so that the evaporation is rapidly diminishing the lake, and the river Schio, which used to carry off its superabundant waters and pour them into the Danube, is now nothing more than a slip of bog; and as for the lake Neusiedel, it appears formerly to have communicated with the Danube by the Raab, into which it emptied its waters, and with which it has now no other communication than by a swamp. The Aral also, it is generally believed, once communicated with the Caspian.

Those lakes which have an outlet without any apparent affluent are fed by subaqueous springs, which, bursting out in a hollow, must fill it up before the waters can flow off in a stream. These lakes are generally situated at considerable elevations above the level of the sea. Thus there is one on Monte Rotondo in Corsica, at an elevation of 9069 feet. From lakes of this kind some of the largest rivers take their rise; the Volga, for instance, springs from such a lake in the government of Tver in Russia.

Lakes which receive one or more tributary streams, and have a visible outlet for their superabundant waters, are the most common and the largest; such are the lakes of Switzerland and of the north of Italy, the lakes Ladoga, Onega, Peipus, and Ilmen in Russia; the Saïma, in Finland; the Wener, in Sweden; the Enara, in Lapland, &c. In Asia there are the Nor-Zaïssan and the Baïkal, &c. In North America, Lake Superior, Lake Huron, Lake Erie, and Lake Ontario are examples of this kind of lake; each of them receives several affluents; and the grand outlet of the whole is the river St. Lawrence.

Lakes owe their origin to different circumstances: some from the sinking of the soil by the falling in of subterraneous caverns; such is the supposed origin of the Baïkal: others are caused by earthquakes; such a lake was formed in the province of Quito in 1797: some by the fall of mountains, as the Oschenen-see in the canton of Berne; or by lava currents damming up the stream, as the lakes Aidat and Cassiere in Auvergne, in France. Many are supposed to be the remains of the universal ocean which once covered the earth, and their waters, originally salt, have become fresh from their receiving constant supplies of fresh water while the salt was continually let off by their outlets.

Almost all lakes are in progress of diminution, although this is not everywhere apparent. The detrital matter brought in by their affluents is imperceptibly filling up their beds; and if regular observations were made, many provinces which owe much of their prosperity to their lakes would find the time fast approaching when these pieces of water will become mere pestilential marshes.

Certain lakes exhibit remarkable phenomena: thus some have floating islands in them, as is the case with

a small lake near St. Omer. The lake Gerdau, in Prussia, has a floating island, on which a hundred head of cattle may be seen pasturing. In the lake Kolk, in Osnabruck, there is a floating island, on which fine elms are growing. Some of these floating islands sink and rise again; thus in the lake Rålang in Smoland, a province of Sweden, there is a floating island which appeared and disappeared ten successive times between the years 1696 and 1766. Other floating islands are found in East Gothland and many other places. Some subterranean lakes are supposed to have become so by the formation and subsequent fixing of floating islands, which successively uniting have finished by forming a solid crust over the water.

Some lakes have a double bottom, which, rising and sinking alternately, changes the apparent depth of the lake: there is a lake of this kind at Jemtia in Sweden.

Some lakes are said to have no bottom; but this is an impossibility: the fact is, that the sound does not reach the bottom, either for want of sufficient weight of lead or length of line, or else it is carried away by under-currents.

In Poland there exists a lake said to render brown the skin of those who bathe in it. Certain mineral waters impregnated with sulphuretted hydrogen are well known to change from white to brown the skins of those persons who have been under a course of metallic medicines, or who use metallic cosmetics, and some such circumstance may be the case with the lake in question.

Some lakes are intermittent: the most remarkable of this kind are those of Cirknitz in Illyria and Kauten in Prussia. They are supposed to be occasioned by a play of natural siphons, upon the same principle as intermittent fountains.

The Lake of Geneva is subject to a subaqueous wind, called the *Vaudaise*, which, rising to the surface, produces an agitation of the water which is sometimes dangerous to the navigation of the lake. Near Boleslaw in Bohemia there is a lake of unknown depth, from the bottom of which there rise, in winter, such violent puffs of wind, that they are said to send up into the air masses of ice of several hundred pounds weight. The sudden escape of gases formed in the bowels of the earth, and perhaps the air forcibly driven out from caverns by the water rushing into and filling them up, may be among the causes of this remarkable phenomenon.

The *Seiches* are a phenomenon which has hitherto been observed only in the Lake of Geneva and some other of the Swiss and Italian lakes, though it is probably common to many others. It consists in an occasional undulation of the water, something like a tide wave, which rises occasionally to the height of five feet. Its cause is not exactly known, though it is most probably due to a local and temporary change of atmospheric pressure. Water-spouts are a phenomenon sometimes seen on lakes as on the sea; they have been observed on the lakes of Zürich and Geneva.

Certain lakes seem to be placed in the immediate neighbourhood of centres or foci of electrical attraction; thus in the lake Huron there is a bay over which electrical clouds are perpetually hovering. It is affirmed that no person has ever traversed it without hearing thunder. The proximity of this lake to the American magnetic pole, that is, to the spot where the magnetic intensity is greatest, not where the dip is greatest, may perhaps have some influence in producing so remarkable a phenomenon.

Near Beja in Portugal there is a lake which is said to announce the approach of a storm by a tremendous rumbling. In Siberia also, near the little river Oreibat, which flows into the Abakan, there is, according to Pallas, a lake called the Roaring Lake, from the dreadful noise it makes, and which announces internal revolutions similar to that which occasioned the rupture of the dykes of the Lake Gousinoï in Douaria.

Some lakes have been observed to possess a petrifying or an incrusting property. The latter is merely a deposition of carbonate of lime. This, being dissolved by an excess of acid in the waters of certain springs, is precipitated whenever the waters of these sources coming into the lakes are exposed to the air and lose their excess of acid.

There is an interesting phenomenon presented by the Lake of Zürich, called the flowering of the lake. When this takes place the surface of the water is seen covered with a yellow scum or froth, which upon examination is found to be a very minute vegetation.

There are various other phenomena presented by lakes, but the most singular of them all perhaps is the attractive force of the mud at the bottom of some lakes, which is such that boats can hardly make their way through the water. The Lake Rose and one or two more in Canada are of this kind. Mackenzie describes the fact in these words:—"At the portage or carrying-place of Maitres, on Rose Lake, the water is only three or four feet deep, and the bottom is muddy. I have often plunged into it a pole twelve feet long, with as much ease as if I merely plunged it into the water. Nevertheless this mud has a sort of magical effect upon the boats, which is such that the paddles can with difficulty urge them on. This effect is not perceptible on the south side of the lake, where the water is deep, but is more and more sensible as you approach the opposite shore. I have been assured that loaded boats have often been in danger of sinking, and could only be extricated by being towed by lighter boats. As for myself, I have never been in danger of foundering, but I have several times had great difficulty in passing this spot with six stout rowers, whose utmost efforts could scarcely overcome the attraction of the mud. A similar phenomenon is observed on the lake Saginaga, whose bottom attracts the boats with such force that it is only with the greatest difficulty that a loaded boat can be made to advance; fortunately the spot is only about four hundred yards over." Captain Back has confirmed the above by his late observations.

Lakes differ very much in temperature, transparency, and in the colour of their waters. Lakes fed by the water of melted snows in summer are generally much colder than would be thought conformable with the season; but the difference is principally in the lower waters, which, being cold, remain at the bottom by reason of their greater density. Some lakes never freeze, which is owing to their great depth. This is the case with Loch Ness in Scotland, which is eight hundred and ten feet deep in the deepest part. Lakes are not subject to tides; at least the amount of tide, so far as observation goes, seems not to be ascertained.

The remarkable transparency of certain lakes is truly astonishing: thus the waters of Lake Superior are so pellucid, that, according to Mr. Heriot, the fish and rocks may be seen at a depth incredible to persons who have never visited these regions. The density of the medium on which the vessel moves appears scarcely to exceed that of the atmosphere, and the traveller becomes impressed with awe at the novelty of his situation. Elliot, in his 'Letters from the North of Europe,' says—"Nothing appears more singular to a foreigner than the transparency of the waters of the Norwegian lakes. At the depth of one hundred or one hundred and twenty feet, the surface of the ground beneath is perfectly visible; sometimes it may be seen wholly covered with shells, sometimes only sprinkled with them; now a submarine forest presents itself to view, and now a subaqueous mountain:" and Sir A. de

Capell Brooke observed of the same lakes—"When a boat passes over a subaqueous mountain of a certain height, the visual illusion is so perfect, that one who has gradually, in tranquil progress over the surface, ascended wondering the rugged steep, shrinks back with horror as he crosses the vortex, under an impression that he is falling headlong down the precipice." In the lake Wetter, in Sweden, it is said a farthing may be seen at the depth of twenty fathoms.

With regard to the colour of lakes, it may be observed that it is sometimes very difficult to account for the tints of large masses of water. The colour of the bottom, the depth, the shadows and reflected colours of surrounding bodies, subaqueous vegetation, springs, and many other circumstances affect the colour of lakes.

Lakes perform a very important function in the economy of the earth. Rain does not always fall: and were it not for lakes, both visible and subterranean, those great natural reservoirs, the greater number of rivers would be dried up in summer, and canals could not have a constant supply of water. The freshness and humidity which these sheets of water occasion by their evaporation are also eminently favourable to the vegetation in their environs. Many lakes are of sufficient extent to be navigated, and thus facilitate commerce and industry. The fisheries of some are very valuable, and others, by the salt obtained from them, are a mine of wealth. Finally, they most agreeably diversify the surface of the earth by the various appearances which they present of the beautiful and the sublime.—*From the Penny Cyclopædia.*



[Penshurst Castle.]

A, Elizabeth Gallery; B, Barrack Room; C, Prison; D, Saccharissa's Apartments; E, Leicester's Bell.

RAMBLES FROM RAILWAYS.

Penshurst (*concluded*).

Among the pictures of Queen Elizabeth's drawing-room, not before noticed, two of Titian's demand especial attention—a Venus Attired, and a Venus Sleeping; both standing out from everything else in the place by the warmth and luxuriance of their colouring. The portraits generally also will well repay examination, as may be supposed, when we mark how often the names of Lely and Vandyke appear inscribed beneath. One of the last-named artist's portraits represents Waller's successful rival, the husband of Saccharissa, Robert Spencer, first Earl of Sunderland; and if the truth be told, however much our sympathies may be apt to incline us to wish the lady had married the poet, it is very certain she married a much nobler person. Waller's political conduct altogether exhibits so little consistency or strength of principle, that we can easily suppose his previous intimacy with Lady Dorothy Sidney had caused her to see and appreciate his character too truly, rather than, as is apparently often presumed, to make her indifferent to it. The nobleman chosen by her as her future partner gave every promise of the future excellencies of his character in those qualities of which Waller was most deficient. At the early age of twenty-two, on the breaking out of the civil war, he joined the royal standard at Nottingham, a proceeding which, with his views, was perhaps on the whole an error, but the error was but an excess of honourable aspirations. In a letter written about this time to his young bride, he says, "How much I am unsatisfied with the proceedings here I have at large expressed in several letters. Neither is there wanting daily handsome occasions to retire, were it not for grinning honour. For let occasion be never so

handsome, unless a man were resolved to fight on the parliament side, which, for my part, I had rather be hanged, it will be said without doubt that a man is afraid to fight. If there could be an expedient found to salve the punctilio of honour, I would not continue here an hour." And although he did fight in the royal cause, and most gallantly, in the first engagement that took place between the hostile armies, at Edgehill, in 1642, yet he would accept no commission; and when he fell, only a year later, in the battle of Newbury, he was still a volunteer; though in the interim he had been raised by Charles to the earldom of Sunderland. He left one son by his wife, the afterwards famous and favourite minister of Charles II., James II., and William III.

We now advance towards the Tapestry-room, so called from two immense productions of the far-famed looms of Gobelins, that decorate two of its sides. The subjects are the Triumph of Ceres, and Eolus unbarring the Winds. The drawing of the figures, the colour, and general harmony of expression are most masterly, and make one fancy the work must be attributed to the period when Le Brun was director in chief of the great French manufactories. Penshurst has in this apartment another of those portraits of Edward VI., by Holbein, which are scattered so profusely among our civic halls and country-mansions, and form so many indications of the popularity of both king and painter at the time. Here also is one of Lely's most beautifully executed pictures, a reclining full-length nude figure of Nell Gwynn; another small full-length of a lady, a charming picture by N. Netscher, and some alabaster antiques from Herculaneum. A picture containing the portraits of two ladies derives its chief interest from the persons represented; these are Lady Dorothy Percy, the mother of Algernon Sidney (in whose beautiful but somewhat masculine features much of the patriot's unflinching resolution may be traced), and Lady Lucy Percy, the well-known Countess of Carlisle, whom Miss Aikin, in her 'Memoirs of the Reign of Charles I.,' describes as "a distinguished beauty, wit, and political intriguer; nor is her memory free from the suspicion, at least, of gallantry; no court lady of her time was equally celebrated or conspicuous. She was flattered in French by Voiture, and in her native tongue by almost all the contemporary wits and poets, and more especially by Waller in verse, and in prose by that singular and mysterious person Sir Toby Matthew, who composed an elaborate character of her, which is sufficiently hyperbolical to wear some appearance of irony, especially in the eulogium which he seems to bestow upon that arrogant scorn with which it was her practice to treat persons of every rank."

A little Picture-closet is attached to the Tapestry-room, containing, among other noticeable works, a fine landscape, by some unknown painter; Titian's Mistress, by himself; a Madonna and Sleeping Child, by Guido; a fine Christ Crowned, and a Head of a Saint, by Giorgione, at once the originator and perfecter of the glowing pictorial harmonies that characterise the Venetian school, and who yet lived but to the age of thirty-four. But to visitors of a certain description there is an object of greater interest than all these paintings put together, that is a portion of the shaving-glass of Sir Philip Sidney, with a strong magnifying-power. Returning to the Tapestry-room, we pass by another door into the Gallery, which is of great length, of sufficient breadth and height, and tolerably well-lighted. Here many valuable works adorn the walls, such as a curious Old Man's Face, by Rembrandt; Bacchanals, by N. Poussin; Telemachus in the Island of Calypso, by Vandyke; a great picture of Apollo and the Muses, by Lely; a large reclining Venus, by Titian; with a Venus Attired, by Lely, from Guido. But perhaps the most remarkable pictures here also are those connected with the memorable personages of the mansion, as the two Sidneys, Sir Philip and his brother Robert, whilst youths, and Saccharissa before and after her marriage. In neither of the last-named portraits, one of which is by Vandyke and the other by Hoskins, do we perceive the personal beauty we are apt to look for in poetical heroines, and which we are so often disappointed in finding, not simply from the nonsensical cause so often talked about, the illusions of the poet's fancy, as from the circumstance that poets see in such faces finer beauties of expression than are visible to ordinary eyes, and which, if understood by the painter's kindred vision, are too subtle to be expressed by his hand on the canvas. The picture of the brothers, by Mark Gerrard, is very curious; it is tall and narrow in shape, representing the youths with their arms linked affectionately together. Their likeness to each other is striking. Philip's taller stature reveals the elder brother, as does also his manly firm-looking position, with the right arm a-kimbo, and the hand upon his waist, reminding us of a taper lady's of the present day, for it contrasts with the swelling drapery about the hips. There is something touchingly beautiful in the nestling sense of security which seems to have impelled the younger brother Robert to his side, and from whence he now looks abroad on the world. It was to this son that Sir Henry Sidney, the father, wrote the letter in which he thus spoke of the other: "Follow the advice of your most loving brother, who in loving you is comparable with me, *or exceedeth me*. Imitate his virtues, exercises, studies, and actions. He is a rare ornament of his age; the very formula that all well-disposed young gentlemen of the court do form also their manners and life by. In truth, I speak it without flattery of him or myself, he hath the most virtues that I ever found in any man." Next to the being the son thus spoken of, who would not wish to be the father who thus could speak? In the centre of the gallery, on the left hand as we go down it from the door, is a little recess, hung round with pictures, and having in the centre a small table with the arms of the family richly emblazoned, exhibiting the whole of its quarterings (or arms of other families with which it has been connected by marriage), ninety-five in number, and comprising in rank the most distinguished houses of England. We see here, for instance, the arms of the Warwicks, Leicesters, Essexes, Northumberlands, Pembrokes, Carlisles, Burleighs, Sutherlands, Rutlands, Strangfords, and Sunderlands. We may here notice the family connexion with a greater than any of these; Percy Bysshe Shelley was a nephew of the present Sir John Sidney, and the cousin of Sir John's son, Lord de l'Isle, the present possessor of Penshurst. Of the pictures in the recess there are two of great interest from their age, small works by Simon Mercati, 1340, from the dispersed collection of Charles I., and several for their intrinsic excellence: we may particularise a Madonna, by Leonardo da Vinci; a striking portrait by Holbein; a splendid little picture of a Holy Family, by Annibale Carracci; and the Flood, by N. Poussin, which, however, unfortunately hangs high and in a bad light.

Besides the pictures, of which the slight foregoing notices can give but a very inadequate idea, Penshurst is rich in wealth of other kinds, such as curiosities, family papers, and memorials. Among the former may be classed the curious and rich-looking cabinet, given by James I. to the Earl of Leicester, the Robert Sidney before mentioned; the front is inlaid with small paintings, and have in different parts miniature gilded busts. The locks of hair that have been so carefully

preserved are more than curiosities, when we know that it was from the head of the poet or the patriot that they were cut. In looking upon these almost sacred relics of Philip and Algernon Sidney, in the very prime of their manhood, when each in his time and path was fulfilling the lofty destiny marked out for him, we are forcibly reminded of the beautiful lines by Leigh Hunt—

> "There seems a love in hair, though it be dead:
> It is the gentlest, yet the strongest thread
> Of our frail plant,—a blossom from the tree,
> Surviving the proud trunk; as if it said,
> Patience and Gentleness in Power. In me
> Behold affectionate eternity."

As a proof of the genuineness of the respective portraits, it is not unworthy of observation that the colour of the hair in them agrees with the colour of the actual locks preserved. Of the family papers it may be said that we do not yet know their full value, although so much use has been made of them. Here are letters, journals, inventories, household-books, with miscellanies of the most various kinds, the writers in many cases being the more distinguished members of the family, from the greatest downwards. The household-books, two in number, were those of Algernon Sidney's father; and present us, among the general detail of the economy of the mansion, with notices of Algernon's "room," and the puddings, birds, mutton, and other viands there provided for him. The expenses of the family at that period were truly enormous: one week, in 1625, there was paid in the kitchen, for flesh, fish, poultry, butter, eggs, groceries, 20*l.* 17*s.* 10*d.*; pantry and cellar, in bread, beer, sack, claret, &c. 11*l.* 13*s.* 10*d.*; laundry, soap and starch, 1*s.* 11*d.*; stables, for hay and oats, 1*l.* 14*s.* 8*d.*; fuel, in charcoal and billets, 3*l.* 9*s.* 0*d.*; in all about 50*l.* for the week, or at the rate of 2500*l.* a year: no wonder the old English hospitality remains still a by-word among us, though the hospitality itself has disappeared.

ECONOMICAL USES OF THE OAK.

[Continued from page 276.]

THERE are some very curious circumstances connected with the excrescences or diseases of the British Oak; but we will speak of those when treating of the gall-nut of the foreign oak, and will now proceed to notice the useful properties of the

Turkey Oak. The wood and bark of this tree are considered to bear a near resemblance to those of the British oak; but as this variety has been known in this country only about a century, very few specimens have attained a sufficient size to be cut down for timber, and but little experience has hence been obtained. Some few years ago Mr. Atkinson, wishing to test the quality of the timber, cut down two trees at East Hampstead, in Berkshire, a seat belonging to the Marquess of Downshire, and had the wood made into doors for the principal rooms of the mansion. In speaking of this wood, Mr. Atkinson says, "It is much finer in the grain than that of our British Oak, or foreign wainscot; it takes a better polish, and is more beautiful than any other oak that I have ever seen. From only a single specimen, which I had broken, it was not so strong as our native oak, but equal in toughness; but my specimen being rather cross-grained, it was not a correct experiment, and I suspect it is equal in strength to our oak. For all ornamental purposes where the wood has to be polished, it is superior, and must be a profitable tree to plant, as it grows much quicker than our common oaks." Mr. Loudon says, that on inquiring what was the opinion held at East Hampstead, at a later period, respecting the qualities of the Turkey oak, he was informed that the wood is not much inferior to that of the English oak if kept quite in the dry; but that it will not stand in water, or in situations where it is alternately wet and dry, so well as that species; that if the tree is allowed to grow to the ordinary age at which the British oak is felled, the wood is very apt to get shaky at the heart; and that Turkey oaks require to be felled as soon as any dead twigs are seen in the topmost boughs, or in about sixty or eighty years after planting. The Turkey oaks grown in the south of France are much employed in the southern ports of that country for ship-building; and those grown on the southern shores of the Black Sea are similarly used at Constantinople.

The *Valonia-Oak*, nearly allied to the one just named, and growing in the Archipelago, yields the *valonia* of commerce. This valonia consists of the acorns and cups, and is annually brought to Europe, where it is in great demand for tanning, being said to contain more "tannin" in a given bulk of substance than any other vegetable. There are 150,000 cwts. imported in a year, at from 12*l.* to 15*l.* per ton.

American Oaks. There are several varieties of oak found in America, which belong to that continent rather than to Europe. One of these, the American *White* Oak, Michaux describes as being the kind of oak most employed both for ship-building and for house-building, in America; and he adds that in Philadelphia, Baltimore, and nearly all the towns in the middle states, the frame-work of all the well-built houses, whether of wood or brick, is formed of the timber of this tree. It is seldom, however, used for the floors, or outer covering of wooden houses, from its liability to warp and split. The wood of the younger trees is very elastic, and is capable of such minute subdivision, that it is used for many of the purposes of the willow or the bamboo, or even whalebone; such as basket-making, carpet-brooms, seats and backs for chairs, the rims of sieves, the bottoms of riddles, and carters' whips. The wood is also used for milk-pails, the handles of axes, and other rural purposes. It furnishes an immense supply of staves for wine-casks, which are exported to Madeira, Teneriffe, and other wine-countries. The bark is employed for tanning; and the acorns are eaten by the American Indians.

The other varieties of American oak produce timber less known than the above. There is one, however, called the *Post Oak*, of which Michaux says:—"Growing in a less humid soil, its timber is less elastic, but finer grained, stronger, and more durable, than that of the White Oak: hence it is preferred, in America, for posts; and is used with advantage by wheelwrights and coopers. In ship-building, it is employed principally for the knees, as it seldom produces planks large enough for the sides." The remaining American kinds are each noticeable for some one or other quality which distinguishes them from the rest. Thus, the *Chestnut* oak, from its property of splitting in a straight line, and of dividing into fine shreds, is used by the negroes for making baskets and brooms; while another kind, distinguished for the opposite quality of twisted and crooked branches and limbs, produces pieces of timber admirably adapted for the knees of ships, and yields bark, extensively employed at New York for tanning. The wood of the *red* oak is used for sugar-casks and similar purposes; it yields a large quantity of the tanning principle; and its acorns are eaten voraciously by wild animals, and also by the cows, horses, and swine, that are allowed to range in the woods after the herbage has perished.

The *Dyer's Oak*, or Quercitron Oak, is a kind which has acquired that name from the value of the bark as a dye material. In respect to its timber, it is very much

esteemed in America for strength and durability, though the wood is porous and cross-grained. In Philadelphia it is employed in building, and in most parts of the northern states it is used as a substitute for the white oak, whenever that tree is scarce; while a large proportion of what are called the "best red oak staves," which are used in Canada and the West Indies to form casks for flour, salted provisions, and molasses, are made of the wood of this tree. The bark is extensively used in tanning, for which it is well adapted, as it is produced abundantly and is rich in tannin.

The substance called quercitron is, however, the product for which this variety of the oak is most valued. Dr. Bancroft first discovered and applied the dyeing properties of the quercitron, and he obtained a patent for his invention in 1775, but the American War breaking out soon afterwards he reaped little profit from his discovery, though it has been of great advantage to the arts and manufactures of both England and America. The epidermis or exterior blackish coat of the bark, affords a yellow colouring matter, which however is less pure, and more inclined to a brownish hue, than that of the other coats. In preparing the dye material this outer part is first removed, and the remaining cellular and cortical parts are ground by mill-stones, which separate them partly into a light fine powder, and partly into stringy filaments or fibres. The powder yields more quercitron than the fibres, but both are mingled together preparatory to its extraction. The colouring matter is readily extracted from the powder and fibres by the action of warm water. The quality of the drug as a yellow-dye was slightly noticed in our No. 68.

The *Holm* or *Common Evergreen Oak*, or *Ilex*, is a large shrub, or small tree, brought originally from the countries bordering on the Mediterranean, but now extensively cultivated in England. It was well known to the ancients. Pliny mentions some holm-oaks in existence when he wrote, which according to his statement, must have then been, at the lowest computation, fourteen or fifteen centuries old. One tree, he says, grew in the Vatican, and was older than Rome itself; it had brazen letters, in the ancient Etruscan characters, fixed upon its trunk, from which it would appear, that before the city was founded, or even the Roman name was known, this oak was a sacred tree.

Cato and Columella recommended the leaves of the ilex, or holm oak, as a litter for sheep-cotes, when straw could not easily be procured; and Pliny states that the Romans sometimes made their civic crowns of it. This tree is very much known in the south of Europe, and is frequently alluded to both by the ancient and modern poets of those countries. Thus Garcilasso has some lines which indicate the esteem in which the fruit of this tree seems to be held:—

"Hast thou forgotten too,
Childhood's sweet sports, whence first my passion grew,
When from the bowery ilex I shook down
Its autumn fruit, which on the crag's high crown
We tasted, sitting chattering side by side?
Who climbed trees swinging o'er the house-deep tide,
And pour'd into thy lap, or at thy feet,
Their kernel'd nuts, the sweetest of the sweet?"

The heart-wood of the ilex is of a brown colour, very close-grained, heavy, and very hard; so much so, indeed, that Parkinson says "it is not easie for an axe, but for a saw to cut it." It takes a fine polish, but twists and splits a great deal in drying. It is of great duration, and also of considerable flexibility; for which reason, in Languedoc, helves of hatchets and other instruments are made of it, and are found to preserve their flexibility even when dry. Du Hamel, when speaking of the qualities of this oak, observes that the great weight of the wood ought not to be considered a defect, even in the construction of vessels; because, if it is employed in the bottoms, it will serve instead of ballast, and if it is employed in the upper parts, it may be used of small dimensions, as it is much stronger than common oak. He recommends using it in preference to every other species of oak, wherever it can be obtained of sufficient size, more especially in cases where it has to resist friction. Evelyn says the wood of the ilex is serviceable for many purposes, particularly for handles to tools, mallet-heads, chairs, axle-trees, wedges, beetles, and palisadoes in fortification. The ilex wood has been strongly recommended as knee-timber for ships. A recent traveller in Spain, Captain S. E. Cook, states that the ilex produces the best timber in the southern and middle regions of the Peninsula. 'It is,' he adds, 'now unfortunately the only fine wood in most parts of Castile, which is hourly diminishing the scanty stock that yet remains. The mode of cutting increases the evil, the practice of the peasantry being almost invariably to level the whole tract which they attack.'

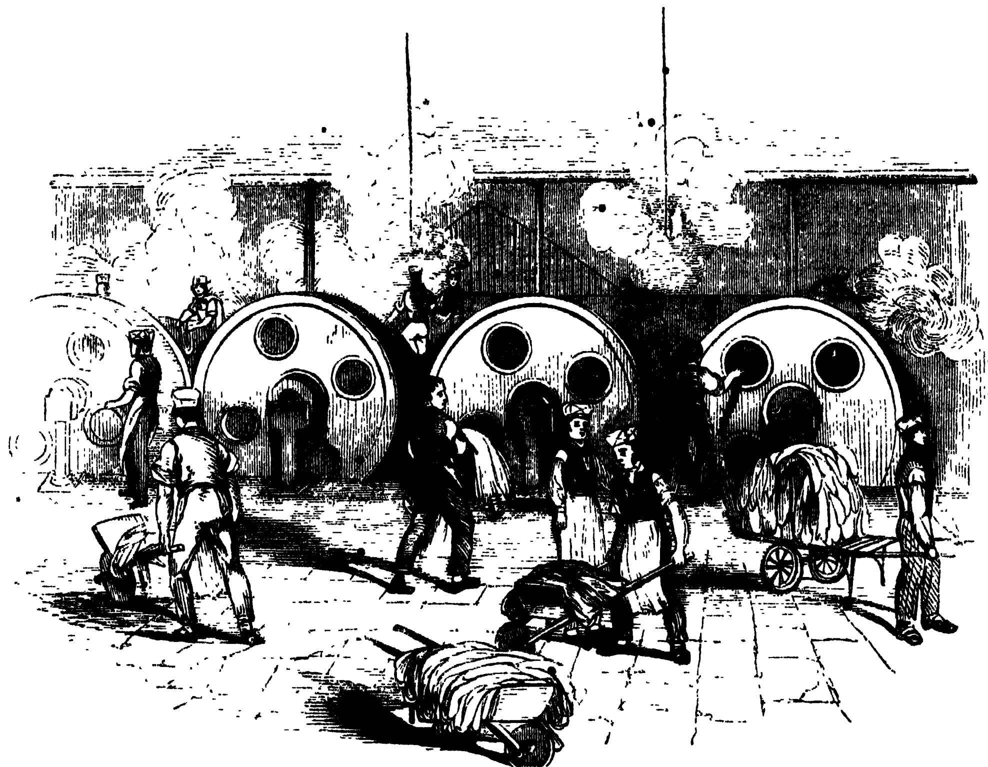
The same writer describes another species of oak growing also in Spain, of which the acorns as a fruit are considered quite equal to the chestnut. To give this sweetness, he says, they must be kept a year; at first, they have a considerable taste of the tannin, like those of the other species, which disappears in a few days, and accounts for the scepticism of some writers who assert that both sweet and bitter are the produce of the same tree, and that their sweetness is no character. These are the edible acorns of the ancients, which they believed fattened the tunny fish on their passage from the ocean to the Mediterranean; a fable only proving that the acorns grew on the delicious shores and rocks of Andalusia, which unhappily is no longer the case. Remains of them may however still be traced in the west, and they fattened the swine which produced the celebrated salted meats of Malaga and that vicinity. These are the bellotas which Teresa, the wife of Sancho Panza, gathered herself in La Mancha, where they grew in the greatest perfection, and sent to the duchess, wishing instead of their being only the best of their kind they were the size of ostrich eggs. I have frequently seen them produced by individuals and offered to the company as *bon-bons*, with a sort of apology for their small intrinsic value from their size and flavour. These choice acorns are about an inch and a half in length, and [illegible] than half as wide.

The *Live Oak*, or *Quercus virens*, is a kind whose wood is very highly esteemed in the United States for ship-building. Michaux says that from its great durability when perfectly seasoned, it is almost exclusively employed for the upper part of the frame, and that to compensate its excessive weight it is joined to the red cedar, which is extremely light and equally lasting. In the southern states, the live oak is used for the naves and felloes of heavy wheels and for screws and cogs of mill-wheels, for all which purposes it is far superior to the white oak. The bark is excellent for tanning, but it is so hard and thin that the quantity supplied is insufficient. From the acorns, which, though not sweet, are edible, the Indians extract an oil which they use in cookery.

The *Cork Oak*, or *Quercus Liber*, yields to us a substance so remarkable that no other, either of vegetable, animal, or mineral produce, has been found to equal it for the particular purposes to which it is applied. This substance, *cork*, and the mode of procuring it by peeling off the bark of the cork trees in Spain, have been already described in our No. 460, and need not therefore engage our attention here.

[To be continued.]

A DAY AT A LANCASHIRE PRINT-WORK.



[Washing by Dash-Wheels (in Bleaching and Dyeing).]

There is, perhaps, no other occupation throughout the whole circle of the manufacturing arts requiring so extensive a combination of taste, chemistry, and mechanism as *calico-printing*, or the printing of woven fabrics. The combination of three such opposite agencies may sound oddly; but this is the very circumstance which places the operations in so high a rank; since, although we may meet with as fine taste, as dexterous chemical manipulation, or as exquisite machinery in many other manufactures, we nowhere find all three combined in so remarkable a manner as in this. The eighty or ninety print-works which are now in operation in Lancashire are among the most interesting establishments in the county; and we shall find a 'visit' to one of them both pleasant and instructive.

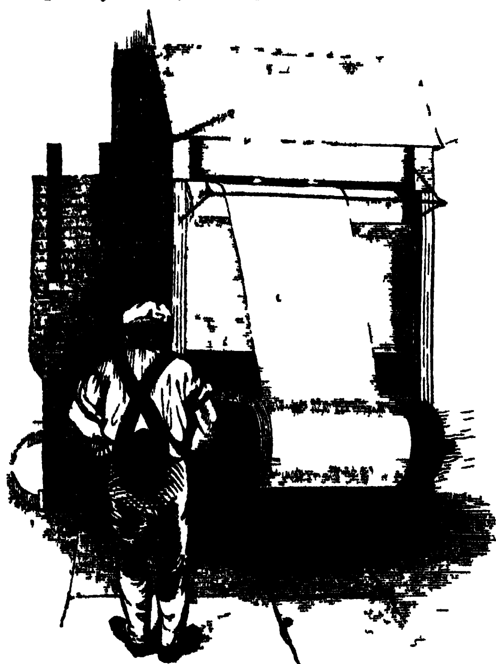
When calico, muslin, or other cotton fabrics have been spun and woven, as described in our last Supplement, they generally undergo one or more finishing processes before being brought to market. If they are to be sold in the white state, they require *bleaching;* if in a coloured state, they require *dyeing;* if in a decorated or ornamented state, they require *printing:* and hence it arises that there are in Lancashire, as also in the Glasgow district, *bleach-works, dye-works,* and *print-works.* As, however, a well-printed piece of cotton requires to be bleached and dyed as well as printed, the print-works have, in most cases, the means for carrying on the bleaching and dyeing, as well as the printing processes; and we have thus facilities for witnessing all three operations in one establishment. Most of the print-works are situated in the valleys at a short distance from Manchester, in order to have a supply of water from the streams which flow through them. The proprietors of the eminent firm of Thomas Hoyle and Sons, who have one establishment at Mayfield, in the environs of Manchester, and another at Dukinfield, have obligingly permitted us to illustrate the general character of this branch of manufacture by reference to those works. At the Dukinfield works bleaching and dyeing are carried on; at the Mayfield works, dyeing and printing: and we will visit the former, as being preparatory to the latter.

Bleaching is now a very different process from what it was in the last century. At that time it required a period of several months to bleach a piece of cloth, and this, too, only in the summer time: in some cases the cloth was sent in the spring of the year to Holland, to be bleached on the level grassy plains of that country, and returned in the autumn; while in other cases, when bleached in the English fields, there was so much depredation as to lead to an unhappy system of severe laws and general distrust. Chemists were thence led to inquire whether means might not be adopted more expeditious than exposure to the open air of a bleach-ground. Home, Scheele, Berthollet, and Henry, made successive steps in this direction, and paved the way for the introduction of the use of *bleaching-powder*, by Mr. Tennant, about the year 1800. From that date the present most efficient system of bleaching has been followed in the great works of the

north, and we shall be enabled to see how the processes are practically conducted.

The Dukinfield works occupy a very large area of ground on the banks of the Tame, about six miles from Manchester, comprising the *croft* or bleach-house, the dye-house, the reservoirs and water-filters, and subsidiary buildings. The supply of water required in bleaching and dyeing is enormous, and extensive arrangements are necessary for the filtering of the water before using, since the success of the processes very much depends on the purity of the water. The water is pumped up from the river by a steam-engine, at the rate of about fifty thousand gallons per hour, into a large reservoir. This reservoir is bedded with gravel, so disposed in strata that the water can filter through it into a receptacle, from which it may be drawn up in a pure state: in fact, the filtering is very analogous to that of the 'thorough-draining' system in Scotch agriculture, in which the water is collected in tile-drains beneath the porous strata. From this filtering reservoir the water is conveyed to the croft and the dye-house.

In the croft and its adjacent rooms are all the arrangements and apparatus for bleaching. The cotton cloth (for we shall confine our details chiefly to cotton fabrics) is brought to the works in the 'grey state,' in compact bundles about a foot wide, as much in depth, and as long as the width of the cloth. These bundles are opened, and consigned to the care of women, who sew the pieces end to end into a very long strip. A 'piece' of cotton cloth varies from twenty-four to forty-seven yards in length, and from twenty-eight to forty inches in width; but the kinds woven and printed in England are generally twenty-eight yards long by twenty-eight inches wide. The women sew or tack ten of these pieces end to end, thereby producing a compound piece two hundred and eighty yards long. This long strip is then carried to a singularly arranged singeing furnace. There is a

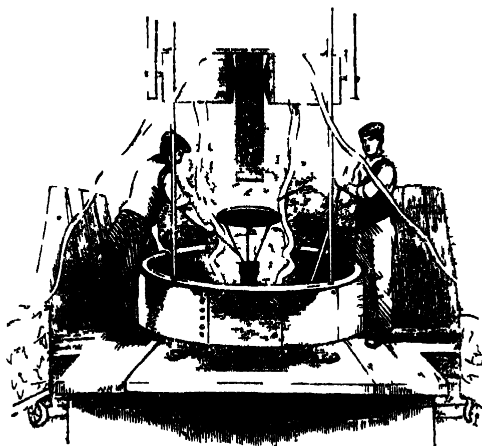


[Singeing.]

heated surface of copper over which the strip of cotton is drawn rapidly one, two, or three times, by which the light hairy filaments are singed from the surface of the cloth, and the cotton passes round a wet roller to cool from the effects of the singeing.

Matters are then ready for the bleaching process. The *croft* (so named probably because it renders the same service as the croft or bleaching-ground under the old system) is a large and busily occupied stone-floored building, filled with coppers and vessels of various kinds, abundantly supplied with water, and not often free from clouds of steam. Here successive washings, boilings, and steepings bring the cotton to a white state. In the first place the singed cloth, which has acquired a kind of nankeen colour, is further sewn up, until five hundred pieces are connected together end to end; that is, there are 500 × 28 = 14,000 yards, or eight miles of cloth in one continuous piece. This enormous piece passes into a *washing engine* to cleanse it from the 'dressing' or mucilage which the weaver had introduced into his warp. The engine contains an abundant and constantly renewing supply of water, and the cloth is wound spirally round a kind of beam above it, hanging in the water in a succession of bends or curvatures. The cloth travels onwards, and in so doing passes twenty times through the water beneath every part of it, ascending and descending twenty times before it leaves the machine. About two hundred and fifty yards are thus washed per minute; and the paste which is washed from the cloth is carried away by a pipe to the river.

As the cloth leaves the washing machine it is taken by one or two men, and folded backward and forward till the whole connected piece forms a cube of five or six feet. In this heap it is again removed to undergo the process of liming. The cloth passes into a kind of boiler called a keir, where it is exposed for



[Keir, or Boiler.]

eight or ten hours to the action of a solution of lime, forty pounds of lime being used for the eight miles of cloth. In this keir the hot liquor is brought up a central tube in such a manner, that being echoed or reflected from a surface above, it falls down on the cloth in a profuse shower, thus acting equally on the whole of the cloth. The cloth is next subjected to a second washing to remove the lime which may be retained by its fibres. Then ensues the process of 'grey souring,' in which the cloth passes through a machine similar to the washing-machine, but containing very dilute sulphuric acid instead of water; and after this there is a third washing in the machine, to remove all the adherent acid. After this comes the 'first ashing.' Twenty-four miles of cloth (the real extent of the operations will be better appreciated thus than by

speaking of 1500 pieces) are put into a keir, or cast-iron boiler, and exposed for sixteen hours to the action of a boiling-hot solution of soda: this constitutes the 'ashing.' Then, for a fourth time, the cloth is washed, preparatory to the process oddly named 'chemicking.' Why bleaching-powder should be called 'chemick,' and the process of applying it 'chemicking,' we do not know, unless on account of its being the most important chemical agent in bleaching: but such is the language of the bleachery. A weak solution of bleaching-powder, or chloride of lime, is put into a machine something like the washing-machine, and the cloth is passed through it. After lying wet in a heap for six or eight hours, to allow the 'chemick' to act on the fibres, the cloth goes through the process of 'second souring' in weak sulphuric acid, somewhat as before. It is then washed for a fifth time in the machine; to which succeeds the 'second ashing;' then a sixth washing; then a 'second chemicking,' then a 'third souring;' and then a seventh washing. It will thus be seen that there is a succession of processes following in a certain order; the three agents, sulphuric acid, soda, and bleaching-powder being separately applied, each more than once, and the cloth being washed in clean water after every such application. So powerful is the bleaching-agent, that 7 lb. of chloride of lime are said to suffice for the bleaching of 500 pieces of cloth. The machines here described are a late improvement; for until recently the cloth was dipped in tanks to be 'soured' and 'chemicked,' and thence hauled up by poles.

After a process of 'hot-watering' and squeezing, the cloth leaves the bustling and well-filled croft, and passes up into an upper room, where it is formed into a pile on a wheel carriage, and wheeled to a long table or bench. Boys and girls then take the cloth in hand, and rip or pick the pieces asunder, so that each piece of 28 yards becomes again separated from the others. Each piece is folded into a flat square mass, and men beat these masses against the edge of a stone in a peculiar manner, for the purpose of removing creases from the cloth. The cloth is then hung up on wooden bars in a drying-room, which is heated to a high temperature by steam-pipes near the floor. Finally, the bleached cloth, which now presents a whiteness of the utmost purity, is brought into the warehouse, sorted, and tied up into parcels of ten pieces each.

Such is a brief sketch of the process of bleaching; and whether we notice it in connection with dyeing and printing, as in the present case, or take the instance of a bleachery independent of them (of which there are many in Lancashire), the preceding details will equally serve to convey a general idea of this important process.

Let us next visit the *dye-house*. The five thousand miles of cloth which are bleached in a year in the 'croft' are next dyed before they are printed, or else printed before they are dyed, according to circumstances; and the dyeing is in some cases effected here, at Dukinfield, and in others at the Mayfield establishment. The dye-house at Dukinfield is, we believe, deemed one of the finest in the kingdom. It is more than a hundred feet square, and is provided with a very complete system of drainage, to carry off the vast quantity of soiled water which every day's operations render useless. It is a low-roofed building provided with skylights, which can be opened when necessary. The chances are, when a stranger first visits the building, that he will be totally unable to see the machines, the workmen, or the processes within, on account of the dense atmosphere of steam from the various coppers and boilers; but upon becoming a little used to this source of discomfort, he sees that there are vessels of various kinds ranged in rows from end to end of the building. These vessels we may briefly describe thus:—

The 'dash-wheel,' of which there are several, is a hollow circular wheel, about six feet in diameter and two feet deep, having four compartments within, and four circular openings in one face, one to each compartment. Water is admitted to the interior of the wheel by a pipe close to or concentric with the axis on which the wheel rotates. Cloth is put into each of the compartments, and water being also admitted, the wheel is made to rotate rapidly, and thus to wash the cloth by violent agitation. Another kind of vessel, of which the varieties are more numerous than any other vessels in the dye-house, is the 'beck' or tank, having over it a kind of frame-work rotated by a winch. In all such machines, whether called 'dye-becks,' 'soap-becks,' or others, the cloth is wound or wrapped on the frame, so as to dip into liquor contained in the beck; and the rotation of the frame by means of a winch causes every part of the cloth to dip successively into the liquor. This is a very common method of saturating cloth with the various liquids employed in dyeing; the liquids being in most cases heated by steam. 'Cisterns' of various kinds are employed to steep the goods, without the aid of the winch apparatus above. There is also a beautiful machine, the operation of which is to drive out nearly all the water after steeping in any of the liquors. The machine consists of a double vessel, the inner one of which is perforated: the wet cloth being put into the inner vessel, and rotated with a velocity of nearly one thousand revolutions in a minute, the centrifugal force thus generated drives the cloth in close contact with the perforated surface, and forces all the water through the perforations, leaving the cloth nearly dry.

The spot where this establishment is situated, viz. Dukinfield, is one of those to which we alluded in the last Supplement as having sprung up into importance solely through the agency of the cotton-manufacture. Cotton-factories are to be seen at a little distance from it on either side, comprised within the limits of Staley Bridge, Ashton, Dukinfield, and Hyde; and the Mersey, or, as it is here called, the Tame, winds past many a bleach-ground and dye-work in its progress towards the sea.

We will now follow the bleached cloth to the establishment at Mayfield, where it is to undergo the beautiful and important process of printing. Mayfield was at one time really a field, before Manchester made such giant strides on every side; but it is now part of Manchester, in the same way as Mayfair is part of London. The works at Mayfield have been gradually increasing in extent for sixty years, and now appear more like a small town than a single establishment, for there are so many open courts and small lanes and passages, so many distinct and isolated buildings, and the whole cover so large an area of ground, that a visitor is apt to lose sight of the connection between them, and to forget that they form, in fact, but one great workshop. There are several distinct departments, which, noticed separately, will serve to convey a notion of the general arrangement of a large print-work; such as the mechanical department, the chemical department, the reservoirs, the designing or artistic department, the printing department, the dye-house, and the finishing.

Many of the printing-machines, the mixing-machines, and other pieces of mechanism incidental to dyeing and drying, require frequent adjustment and repair, as well as a constant and efficient moving-power. Hence steam-engines, engine-houses, millwrights' shops, smiths' shops, and other analogous arrangements, are provided, as in most large establishments in the manufacturing districts.

The chemical department is, however, infinitely more important, or rather, it is more characteristic of a print-work. Perhaps there is no one in any occupation or station of life more conversant with practical chemistry than a first-rate calico-printer. He must study not only the chemical effects of one drug upon another, but the degree in which the vegetable fibres of the cloth will retain those drugs and combine with them; and in endeavouring to imitate the colours of a selected design, he must choose such colouring-agents as will impart to cloth the same tints as the design exhibits on paper. He has to determine also, by oft-repeated experiments, what combinations will make 'fast' colours, since the reputation of the firm greatly depends upon this. Hence in every large print-work there is either a partner or a manager thoroughly versed in practical chemistry; and the drug or chemical department in such establishments shows the importance attached to this matter. At the Mayfield works there is a laboratory fitted up with all the requisite apparatus, such as retorts, sand-baths, furnaces, &c. for making chemical experiments. The shelves are filled with phials and vessels containing most of the usual acids, alkalis, salts, and metallic oxides to be experimented on: and in an adjoining apartment is a chemical library, containing most of the standard works on the theory and practice of chemistry. The calico-printer must not lag behind in the march of science; he must know all new important facts relating to the chemistry of colours as soon as they are made public, and he must therefore have at command the requisite documents and sources of information. Near the laboratory is the colour-house, a large and lofty workshop in which the colours are prepared. Around are dozens and scores of boxes, barrels, jars, and bottles, containing the crude drugs as brought from the manufacturers; and near at hand are the vessels in which and the apparatus by which these drugs are brought into a state fit for use. Copper vessels heated by steam, like sugar-pans, mixing barrels, crushing and grinding apparatus, &c. form some portion of these arrangements.

The reservoirs for containing and filtering the water are similar to those at Dukinfield, and cover a considerable area of ground, almost close to the viaduct of the Manchester and Birmingham Railway: indeed we believe the railway was carried through part of the ground of the works. The reservoirs are emptied from time to time, in order that the layer of gravel at the bottom may be renewed, and a clean stratum laid down, as an efficient filtering medium. A very extensive system of pipes is provided to carry the water to the various vessels where it may be required for use.

Next we come to the highly interesting and important *designing* or *artistic* department, in which all the devices are produced for printing on the cloth. The mode in which these designs are imprinted is very little known, except in the immediate manufacturing districts; nor was the extent of the artistic arrangements at all generally suspected until the Parliamentary Committee on the Copyright of Designs made their Report in 1840. The mode of printing, as we shall presently explain, is a kind of combination of the methods employed in floor-cloth printing, paper-staining, and common press-work, as also machine-printing and colour-printing; for it combines the principle of all these varieties. But before detailing these, we must speak of the designs themselves.

Every piece of printed calico, muslin, or "mousseline de laine," receives its impress from either a piece of metal or a piece of wood; the wood or metal having on its surface a device copied from a coloured drawing on paper. The drawing of these designs is an extensive branch of employment at Manchester; since a rapid succession of novelties in design is one of the points on which the calico-printer relies for success. No matter how elegant a pattern may be, or how great a favourite it may become with purchasers, it will soon outlive its beauties, and acquire that worst of all characters, *i.e.* being "out of fashion." There must thus at all times be new designs in preparation to replace not only those which have had a good run, but those which may from the first prove unsuccessful; for the public, in its wisdom, will sometimes refuse to countenance a design which the printer may have flattered himself is very elegant; and the printer himself may find that a design which looks well on paper will not turn out favourably on cloth. After a design is sketched, it is examined and studied in various ways before being engraved, since the engraving is a much more expensive operation than the designing; and it generally happens that only a very small proportion of the designs which are made are afterwards engraved for printing. Mr. Salis Schwabe, in his evidence before the Committee, stated that in the year 1838 he had had between two and three thousand patterns designed, of which only about five hundred were selected for engraving. The whole of the patterns, in designing and engraving, cost more than five thousand pounds within the year; and this, it must be remembered, was for the patterns for one house only, and in one year. In such a case as this, after the two or three thousand patterns had been sketched, five hundred were engraved, as deemed likely to pay well; but even of this number the printer cannot tell how many may utterly fail—either from the fickleness of the public taste, or from more attractive pattern being produced about the same time—to have a large sale. Mr. Schwabe stated, in illustration of this point, that of the five hundred engraved, only one hundred were decidedly successful; fifty others had a middling result; and the rest had a less favourable fate. Another witness estimated the number of designers in Manchester at five hundred, and supposed that they might produce, one with another, twenty designs per week each, making half a million in the year. Three witnesses estimated that, taking the number of pieces per annum printed in Lancashire, and the wages paid to designers, that the designing costs from a halfpenny to three farthings per piece of cloth. Some of the designs are intended chiefly for the home market; some, especially gaudy patterns, find a more ready sale in foreign parts, while others are equally favourites both at home and abroad. Some patterns, again, are intended for "furniture prints;" that is, for window-curtains, bed-curtains, chair and sofa covers, &c.; while others, comprising the larger portion, are for "garment-prints," whose name sufficiently indicates the character. Furniture patterns are generally more elaborate than garment patterns, and become more expensive. Without entering upon the various opinions expressed before the Committee, as to the effect of a copyright in improving the quality of designs, we shall simply state, that at the time the Committee was appointed, three months' copyright existed; but in September, 1842, a new act came into operation, by which designs for garment-prints were awarded a copyright of nine months, while those for furniture-prints obtained a copyright of three years; every design being registered in a book kept by a registrar appointed by the Board of Trade.

Some of the manufacturing firms purchase their designs from persons who offer them for sale; but the more eminent houses have an establishment of designers and engravers under their own roof. Such is the case at Mayfield. In the designing-room are persons constantly exercising their taste in developing new designs. Sometimes they attempt a new "pattern;"

sometimes a new "style;" for among calico-printers the term pattern is applied to disposition of forms, while style is applied to disposition of colours. In recesses and on tables in the room are large folio volumes containing specimens of all the patterns ever printed by the firm, as well as specimens of the finest foreign productions. The drawings are each about four inches square, and fully coloured. So numerous are the chances against success, that not more than one pattern in about a hundred is finally worked to a successful result; for probably eighty out of a hundred are rejected while yet on paper, and of the remaining twenty not more than one will stand all the severe tests to which it will be exposed, in respect to beauty of appearance on the cloth, facility of working, fastness of colour, and good fortune with respect to the public taste. Hence arises a necessity for an incessant addition to the stock of new patterns.

When the designs are drawn, they are transferred either to wood or to metal, according to the mode of printing adopted. The wood-blocks measure about twelve inches by seven. They have a smooth surface of sycamore on a substratum of some commoner kind of wood; and the design, after being sketched on the block, is cut as in common wood-engraving; the parts being left prominent which are to constitute and print the pattern. In some patterns, where there are fine lines, the wood would soon be worn away or brought to a defective state by use; and to obviate this, little slips of copper are inserted into delicate grooves cut for them, the copper slips all standing at an equal height, and forming the printing surface. Small pieces of felt are in some places introduced to fill up the interstices between the coppers, so as to imprint a broader patch of colour. One block can only print one colour; and therefore if five or six colours form the design, and all be printed by blocks, there must be five or six blocks, all equal in size, but the raised parts in each block corresponding with depressed parts in all the other blocks. The principle involved is precisely the same as that displayed in Floor-cloth printing, which we illustrated with a wood-cut in p. 343 of the last volume.

Another method, quite of modern introduction, is somewhat analogous to stereotype printing. In the first place a model is formed from the design, comprising so much of it as may be included within a space of five inches long by an inch and a half wide. This model is formed of bits of metal inserted into a ground or block; and a mould is produced by stamping from the model. From the mould, fixed in a block and adjusted in a convenient way, stereotype pieces or copies are produced, in a mixed metal of tin, lead, and bismuth. When a number of these pieces are prepared, their surfaces are brought to a perfect level by means of a file, and they are then firmly fixed down upon a stout and carefully prepared piece of wood.

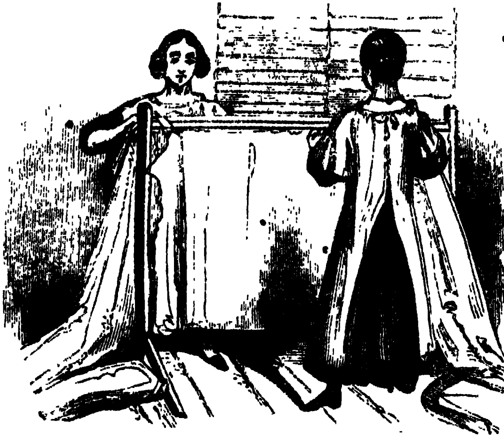
Down to about the year 1785, all woven goods were printed by the block method; but the slowness of the process led to an invention in which the principle of copper-plate printing was employed instead of that of common or press-printing; that is to say, the device is cut *in* a surface of copper, instead of being left *at* the surface of wood. In the 'roller-room' at Mayfield we see indications of the extent to which this method is employed. This room is filled with hollow rollers or cylinders, the external surfaces of which are engraved with devices. Some of the cylinders are about forty inches long, and others about thirty; but all are about five inches in diameter, and half an inch thick. In preparing these cylinders for engraving, the exterior is first brought to the most rigorous exactness and smoothness of surface. The exact circumference of the cylinder is taken by a piece of paper, and on this paper is copied the design, so adjusted that exactly one repetition, or a complete number of repetitions, of the design, may occupy the entire width of the paper, and consequently the entire circumference of the cylinder. Each cylinder is for one colour only, and therefore the paper receives only that part of the design which is to be printed in one colour. The device is slightly marked on the surface of the copper by transference from a kind of waxed paper: and the cylinder then passes into the hands of the engraver, who cuts it by the usual sorts of tools employed by the copper-plate engraver. A most scrupulous exactness of adjustment is requisite in marking and engraving the different cylinders for one device, in order that each one may imprint a particular colour in the precise spot required.

This was the original mode of engraving the cylinders, but Mr. Perkins's principle of multiplying steel-plates has been most ingeniously applied to these cylinders. Mr. Lockett introduced this method into Manchester about the year 1808, and it is thus carried on. A small soft steel cylinder is provided, about three inches long by one inch in thickness; and this cylinder is engraved with so much of the device as its surface will contain. The cylinder is then hardened, and made to give an impress to a softer cylinder, the device being of course *raised* in the second cylinder instead of *sunk;* the second cylinder is then hardened, as the first had been, and becomes the instrument for impressing on the surface of the large copper cylinder the whole of its device. The small original cylinder is called the *die;* the second is called the *mill;* and this mill is applied successively, by the aid of great pressure, to every part of the copper cylinder. The advantage of this method consists in this:—That as the surface of the steel cylinder is not more than one-fiftieth as large as that of the copper cylinder, the amount of work to be done by the graver is proportionably less; and the engraver is thus enabled to devote his attention to the production of patterns which would be too minute, elaborate, and expensive if cut wholly by hand on the copper cylinder.

For some patterns the rollers are engraved by a kind of aquatint process, and the electrotype process is also about being brought into use for the same purpose; but the two just noticed are the principal modes at present in operation. In the roller-warehouse at Mayfield we saw from three to four thousand of these rollers; and as they weigh on an average a hundred pounds each, the ponderous extent of the whole may be judged.

We must now pay a visit to the printing-shops, the scene of those operations to which the designing and engraving are preparatory. There are 'block-printing rooms,' and 'cylinder-printing rooms;' the operations carried on therein being indicated by these names. But there are a few arrangements to which the cloth is subjected before being printed. In the 'cloth department' the rolls or bundles of cloth are opened, spread out upon a table, and carefully examined, with a view to the removal of any loose threads that may appear on the surface. The cloth is then measured by being passed rapidly over a machine a yard in width; and after this twenty or twenty-five pieces are sewn end to end. It then goes to the 'winding-on-room,' where the cloth is wound uniformly round a thick beam or roller preparatory to the printing; passing, in its progress, over a very curious and ingeniously constructed roller, whose surface is so grooved as to take out all creases from the cloth.

The 'block-printing room' is a very long, busily occupied, and most interesting part of the establishment. It contains about fifty block-printing machines, the whole works containing about a hundred and fifty. The whole of the machines are arranged in a double



[Measuring-machine.]

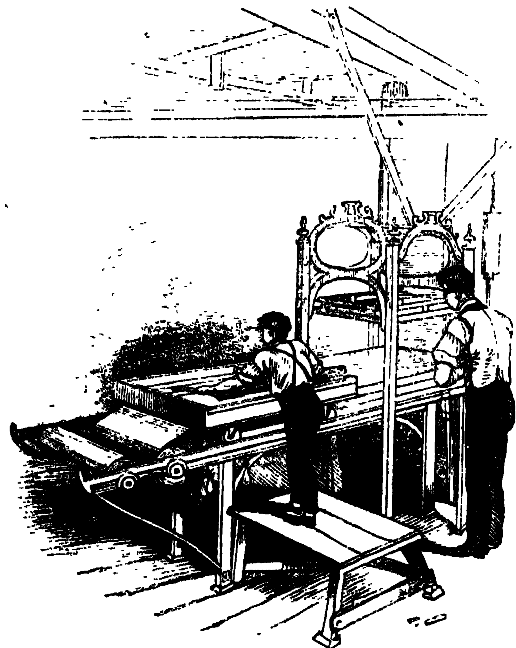
row along either side of the room: all are nearly alike; and all are the scene of operations which may be thus briefly described.* The cloth roller is so adjusted that the cloth, as it is unwound, may lie on the surface of a table to be printed, and after printing may pass on to another roller; the printer regulating this movement. There is to each machine one man to print, and an attendant boy or girl called the 'tearer.' At the outer end of each machine is a small tub or pot containing the colour to be used, and near it a circular trough or drum supported by a water-bed to give it elasticity. The 'tearer' dips a brush into the vessel of colour, and spreads a layer on the elastic trough. The printer then takes his engraved block, holding it by a handle at the back; presses it down on the trough, whose elasticity allows every part of the raised device on the block to take up a layer of colour; and then prints a portion of the cloth equal to the size of the block.



[Block-printing.]

There are small pins or guide-marks at the corners of the blocks, by which the printer is enabled to adjust each successive impress from the block; and herein consists one of the niceties of block-printing. The printer goes on, step by step, until he has printed the whole of one piece with one colour; and then, at a subsequent operation, he works all over the same piece with a second; then, perhaps, with a third; and so on, according to the number of colours in the design; a new block being taken with every new colour.

A second mode of printing, not long since introduced, is the result of a remarkably ingenious arrangement, whereby all the colours may be printed at once. Let us, for the sake of clearness, suppose that the design contains five colours. In such case five sets of stereotype casts are prepared, in the manner detailed in a former paragraph, each set being for the imprinting of one colour, and the whole five forming the combined pattern. A well-prepared tablet of wood is provided, from two to three feet square, and on this are fixed all the stereotype pieces. All the pieces for one colour are ranged in one row or stripe, about five inches in width; all those for another colour form a second stripe, contiguous to and parallel with the first; all those for a third colour form another parallel stripe; and so on for the fourth and fifth. The length of each stripe is about equal to the breadth of the cloth; and the whole form a compound printing block, divided into five compartments. These blocks are used in a printing-machine something like one of the modern varieties employed in type-printing; but with peculiar adjustments to adapt it to the present object. A man manages the press-work, while a 'tearer' applies the colour. The block is fixed with its face or device downwards to the bottom of a descending beam or frame, capable of receiving a vertical motion; and the cloth being laid out on a table beneath, the block is brought down at intervals upon it, by means of a lever managed by the pressman. But before he does this, the block must receive its coating of colour; and this is effected in a very remarkable manner. The 'tearer'



[Press-printing.]

has five little troughs of colour (supposing, as we have in this case, five to be the number) ranged in a row before him; and he has a long piece of wood so formed as to dip into all these five and to take up a small portion of colour from each, which he dabs upon a flat felt cushion. He then takes a kind of brush so

adjusted as to spread out these five colours in an equal number of patches over the surface of the felt, without combining or smearing one over the other. He next slides the cushion along a kind of railway till it comes underneath the block, which is made to descend upon it, and to imbibe a layer of colour all over its surface, each one of the five rows of device falling upon one particular colour on the cushion, without touching the others. The 'tearer' then draws out the cushion again, and the man guides the block in its descent upon the cloth, which it imprints upon five different places in five different colours. All this is repeated a second time; but before the wetted block actually descends, the cloth has been made to shift about five inches lengthwise, or equal to the width of one row on the block. By this arrangement each colour falls upon a part which had been printed with a different colour in the former descent. At the third descent the cloth is again shifted; at the fourth descent again; and once more at the fifth; so that each portion of the cloth is brought in contact with each of the five divisions of the block, and thus receives five different colours. The utmost exactness is requisite in the arrangement of the five divisions of the device on the block, and in the moving parts of the press, in order that all the colours may conduce to the production of a pattern, without confusion or distortion; but this adjustment once attended to, the action of the machine is very beautiful. There are twenty-four of these press machines.

Next we come to the cylinder-printing, by which such wonderful advance has been made in the capabilities of calico-printing. We will first consider the action of the machine in its simplest form, when only one colour is used. The engraved cylinder is placed horizontally, in the lower part of the machine. The cloth, descending from a beam or roller above, passes over and in close contact with the cylinder. The lower part of the cylinder dips into a long trough containing colour; and as it is kept rotating, every part of the surface of the cylinder of course becomes coated with the colour. Now if the cloth were brought in contact with the cylinder in its present state, it would receive merely a confused mass of colour without device or pattern. The means have to be found, therefore, of cleaning off every particle of colour except from the depressed parts of the engraving; and this is effected in a way which is well calculated to excite surprise in a stranger. A long knife is applied to the cylinder, so exquisitely smooth and regular, and so accurately adjusted to it, as to scrape off every particle of colour from the surface, leaving colour only in the depressed engraving, all the rest being so thoroughly cleansed as to pass over the cloth without soiling it. This important appendage to the machine is called the 'doctor,' a name which has been thus oddly accounted for in Lancashire:—When one of the partners in the firm by whom cylinder-printing was originally applied was making experiments on it, one of the workmen who stood by said, "All this is very well, sir, but how will you remove the superfluous colour from the surface of the cylinder?" The master took up a common knife which was near, and placing it horizontally against the revolving cylinder, at once showed its action in removing the colour, asking the workman, "What do you say to this?" After a little pause the man said, "Ah, sir, you've *doctored* it;" thus giving birth to a name for the piece of apparatus. Others seek for an explanation a little more classical, and would derive the name from *ductor* or *conductor*.

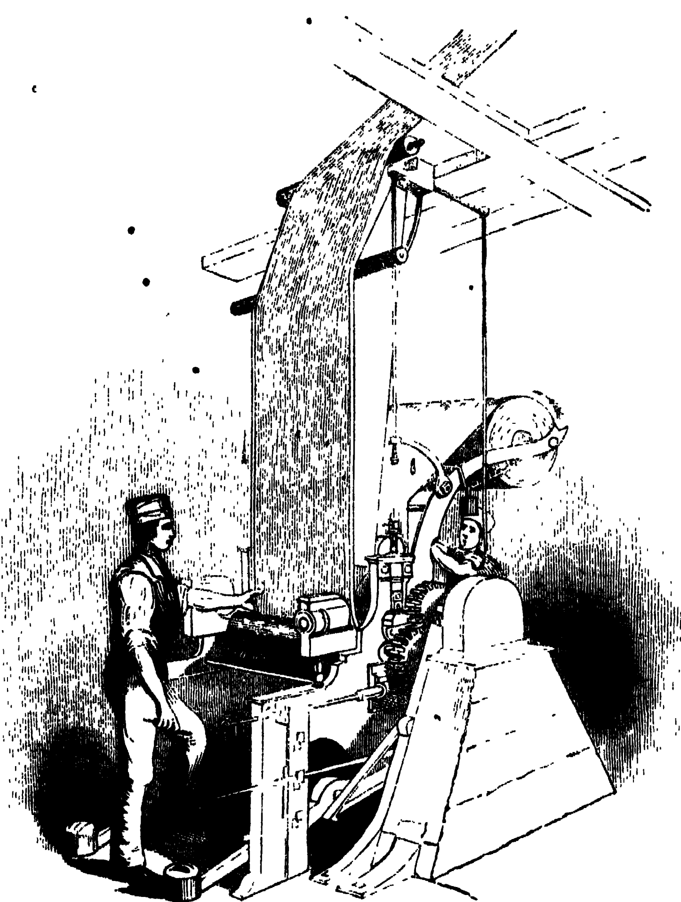
The mode, then, in which cylinder-printing is effected is this. After the cylinder has gathered its coating of colour by rotating with its lower portion in the colour-trough, and has been cleansed by the 'doctor,' the cloth passes in a continuous strip between it and a large roller or drum above, by which it is pressed sufficiently close to the cylinder to imbibe the colour from the sunken device on its surface. As the cylinder is continually revolving, and the cloth was continually passing in contact with it, the printing goes on uninterruptedly without stoppages or breaks, thus presenting a striking difference from block printing. On one occasion, while the cloth was travelling upwards from the cylinder, a portion became disarranged so as to be printed a second time, but in a different direction from the first. This accidental circumstance produced a new pattern which was one of the most successful ever published by the firm in whose establishment the incident occurred.

We have next to suppose that the machine prints several colours at once instead of a single colour. In this case there are as many cylinders as colours, each one scrupulously adjusted to produce its particular part of the pattern. Each cylinder dips into a trough appropriated to itself; each has a 'doctor' to remove the superfluous colour; and the cloth passes in contact with each in turn. What must be the nicety of adjustment to bring all the cylinders to print at the proper places can scarcely be conceived, except by those practically engaged in the process.

Each cylinder machine, of which there are about a dozen at the Mayfield Works, prints a piece of cloth in about a minute and a quarter, or about three quarters of a mile in an hour! Few things are more extraordinary in this department of manufacture than the substitution of *miles* for *yards* in the measurement of the quantity of work done. There are more firms than one in Lancashire, in each of which the length of cotton printed in a year would thread the earth from pole to pole.

We have spoken of the printing process without interrupting the details by allusion to the *dyeing* of the cloth; but a few words must be here offered on this matter. If we had before us one hundred patterns of printed cotton, we should probably find that nearly one hundred different modes of proceeding were necessary in the printing; for not only must the colours be different, but each colour may perhaps require a peculiar groundwork to make it adhere to the cloth. Herein lie the delicacy and complexity of the calico-printer's operations; and hence arises a different chemical formula for almost every different pattern. Sometimes a piece of cloth is partially printed, then dyed, and then printed again; at other times the printing is effected at once; and at others a portion of the printing is to lay on colour which is to be afterwards visible, while the other portion is merely to imprint the cloth with a chemical agent which shall exert some peculiar effect on the colours. This may perhaps be rendered intelligible by alluding to four different kinds of liquids or mixtures, which are printed on the cloth by means of the cylinder, the press, or the block. These four are *colours*, *mordants*, *dischargers*, and *resists*. The name *colours* speaks for itself; it relates to the pigments or pastes which impart colour to the cloth, and includes a very wide range of vegetable and mineral substances. A *mordant* is a liquid mixture which enables the colouring substance to combine permanently with the textile fibre; and this is used when the mordant has a combining affinity with the cloth as well as with the colour, although the two latter, used singly, have no affinity for each other. Thus, if a red colour were imparted to cloth by madder, it would wash out, or not be a 'fast colour;' but if the cloth were previously wetted with an aluminous salt, the madder colour would be permanent. In most cases the mordant is a body of liquid, into which the cloth is immersed; but sometimes it is used in the same way as a paint or

ink by the cylinder machine. *Dischargers*, instead of being intended to fix the colour to the cloth, are used to drive off or discharge the colour after the latter is applied. This kind of chemical agent is used in combination with mordants, thus:—the cloth is wholly saturated with the mordant, but certain parts are also printed with a discharger formed of lemon-juice or some other substance; the result of which is, that when the dye-colour is afterwards applied, it combines with the cloth at the parts where the mordant has been unaffected, but becomes a 'loose' colour at the parts printed with the discharger, so as to be easily washed out from those parts. *Resists* are mixtures which enable the printer to produce white portions of pattern by a process rather different from the discharge-method. The mordant is printed, not dipped, in those parts which are to be coloured in the pattern; while those which are to be kept white are previously printed with a chemical mixture called a *resist* or *resist-paste*. The cloth is then wholly immersed in a dye-vat, but those portions which had been printed with the resist refuse to receive the dye, and hence remain white. It will be seen, therefore, that in 'discharge-work,' as it is called, the white portions are retained by driving out the mordant which would otherwise fix the colour; while in 'resist-work' they are retained by shielding the cloth at those parts from the action of the colour.



[Cylinder-printing.]

The chemical manager of a print-work has to study innumerable points connected with the action of different chemical agents on each other, and on the fibres of the cloth; and hence a description of the precise mode adopted would vary with almost every particular pattern produced. For instance, we have now before us (and should have inserted in this printed sheet, but for certain practical difficulties) a few pieces of different printed cottons, which were thus prepared:—One specimen consists of purple squares separated by white lines: the cloth was first bleached at Dukinfield, and transferred in the bleached state to Mayfield; the squares were printed by cylinder with a mordant of acetate of iron; then stoved; then passed through a hot emulsion of cow-dung; then washed in water; then immersed in phosphate of soda; then dyed with madder, which gave the purple tint to the parts printed with the mordant, but left the rest white; then soaped; then 'chemicked,' to clear or bleach the unmordanted parts; and lastly squeezed, dried, &c. In another specimen, displaying white spots and black flowers on a purple ground, the white and black parts were printed both at once by a two-cylinder machine; the white with lemon-juice to act as a *resist*, and the black with acetate of iron to act as a *mordant*; the purple part was printed by a different cylinder; and the dyeing, clearing, &c. were superadded to these printings. In a third specimen, comprising three different shades of pink, acetate of alumina in three different degrees of strength were employed as the mordants, so as to retain with three different degrees of force the pink dye upon the cloth: two of the shades were printed at once by a double-cylinder machine; and the other was afterwards printed by a third cylinder. A fourth specimen, comprising yellow, green, black, and two shades of red, upon a white ground, went through between thirty and forty processes connected with the printing; it passed twice through cylinder machines, and three times through the hands of the block printers, to apply either the colours themselves, or the mordants or resists by which those colours are effected.

From these few details it will be seen how complex are the labours of the calico-printer. Indeed these do not comprise all the varieties; for in printing 'mousseline de laine,' and some kinds of cotton goods, a particular routine of processes is employed, called 'steam-work,' in which the distinguishing characteristic is the precipitation of the colours on the cloth by the action of steam, in lieu of some of the intermediate processes employed in the other methods.

There are certain finishing processes, such as mangling, starching, drying over steam-heated cylinders, examining, folding, &c., to which the cloth is more or less subjected, according to its quality and the purposes to which it is applied; and many of which would be deemed curious, were not their importance eclipsed by the combination of taste, chemical skill, and mechanical exactness, displayed in the preceding processes. Altogether, this must be acknowledged to be one of the finest of all our manufacturing arts.



[Sir Roger and the Portrait.]

SIR ROGER DE COVERLEY.—No. VI.

The Spectator, No. 122, is wholly by Addison. We give it entire, as it contains many touches of his delicate humour, as well as a quaint view of bygone manners:—

"A man's first care should be to avoid the reproaches of his own heart; his next, to escape the censures of the world. If the last interferes with the former, it ought to be entirely neglected; but otherwise there cannot be a greater satisfaction to an honest mind than to see those approbations which it gives itself seconded by the applauses of the public. A man is more sure of his conduct when the verdict which he passes upon his own behaviour is thus warranted and confirmed by the opinion of all that know him.

"My worthy friend Sir Roger is one of those who is not only at peace within himself, but beloved and esteemed by all about him. He receives a suitable tribute for his universal benevolence to mankind, in the returns of affection and good-will which are paid him by every one that lives within his neighbourhood. I lately met with two or three odd instances of that general respect which is shown to the good old knight. He would needs carry Will Wimble and myself with him to the county assizes. As we were upon the road, Will Wimble joined a couple of plain men who rid before us, and conversed with them for some time, during which my friend Sir Roger acquainted me with their characters.

"'The first of them,' says he, 'that has a spaniel by his side, is a yeoman of about a hundred pounds a year, an honest man. He is just within the Game Act, and

qualified to kill a hare or a pheasant. He knocks down a dinner with his gun twice or thrice a week; and by that means lives much cheaper than those who have not so good an estate as himself. He would be a good neighbour if he did not destroy so many partridges. In short, he is a very sensible man; shoots flying; and has been several times foreman of the petty jury.

"The other that rides along with him is Tom Touchy, a fellow famous for 'taking the law' of everybody. There is not one in the town where he lives that he has not sued at a quarter-sessions. The rogue had once the impudence to go to law with the Widow. His head is full of costs, damages, and ejectments. He plagued a couple of honest gentlemen so long for a trespass in breaking one of his hedges, till he was forced to sell the ground it enclosed to defray the charges of the prosecution. His father left him fourscore pounds a year; but he has cast and been cast so often that he is not now worth thirty. I suppose he is going upon the old business of the willow tree."

As Sir Roger was giving me this account of Tom Touchy, Will Wimble and his two companions stopped short till we came up to them. After having paid their respects to Sir Roger, Will told him that Mr. Touchy and he must appeal to him upon a dispute that arose between them. Will, it seems, had been giving his fellow traveller an account of his angling one day in such a hole; when Tom Touchy, instead of hearing out his story, told him that Mr. Such-a-one, if he pleased, might take the law of him for fishing in that part of the river. My friend Sir Roger heard them both upon a round trot; and, after having paused some time, told them, with the air of a man who would not give his judgment rashly, that 'much might be said on both sides.' They were neither of them dissatisfied with the knight's determination, because neither of them found himself in the wrong by it. Upon which we made the best of our way to the assizes.

The court was sat before Sir Roger came; but notwithstanding all the justices had taken their places upon the bench, they made room for the old knight at the head of them; who, for his reputation in the country, took occasion to whisper in the judge's ear, that he was glad his lordship had met with so much good weather in his circuit. I was listening to the proceedings of the court with much attention, and infinitely pleased with that great appearance of solemnity which so properly accompanies such a public administration of our laws, when, after about an hour's sitting, I observed, to my great surprise, in the midst of a trial, that my friend Sir Roger was getting up to speak. I was in some pain for him, until I found he had acquitted himself of two or three sentences with a look of much business and great intrepidity.

Upon his first rising, the court was hushed, and a general whisper ran among the country people that Sir Roger 'was up.' The speech he made was so little to the purpose, that I shall not trouble my readers with an account of it; and I believe was not so much designed by the knight himself to inform the court, as to give him a figure in my eye, and keep up his credit in the country.

"I was highly delighted, when the court rose, to see the gentlemen of the county gathering about my old friend, and striving who should compliment him most; at the same time that the ordinary people gazed upon him at a distance, not a little admiring his courage, that he was not afraid to speak to the judge.

"In our return home we met with a very odd accident, which I cannot forbear relating, because it shows how desirous all who know Sir Roger are of giving him marks of their esteem. When we were arrived upon the verge of his estate, we stopped at a little inn to rest ourselves and our horses. The man of the house had, it seems, been formerly a servant in the knight's family, and to do honour to his old master, had some time since, unknown to Sir Roger, put him up in a sign-post before the door; so that the knight's head had hung out upon the road about a week before he himself knew anything of the matter. As soon as Sir Roger was acquainted with it, finding that his servant's indiscretion proceeded wholly from affection and good-will, he only told him that he had made him too high a compliment; and when the fellow seemed to think that could hardly be, added with a more decisive look, that it was too great an honour for any man under a duke; but told him at the same time that it might be altered with a very few touches, and that he himself would be at the charge of it. Accordingly they got a painter by the knight's directions to add a pair of whiskers to the face, and by a little aggravation to the features to change it into the Saracen's Head. I should not have known this story had not the innkeeper, upon Sir Roger's alighting, told him in my hearing, that his honour's head was brought last night with the alterations that he had ordered to be made in it. Upon this my friend, with his usual cheerfulness, related the particulars above mentioned, and ordered the head to be brought into the room. I could not forbear discovering greater expressions of mirth than ordinary upon the appearance of this monstrous face, under which, notwithstanding it was made to frown and stare in a most extraordinary manner, I could still discover a distant resemblance of my old friend. Sir Roger, upon seeing me laugh, desired me to tell him truly if I thought it possible for people to know him in that disguise. I at first kept my usual silence; but upon the knight's conjuring me to tell him whether it was not still more like himself than a Saracen, I composed my countenance in the best manner I could, and replied, that much might be said on both sides.

"These several adventures, with the knight's behaviour in them, gave me as pleasant a day as ever I met with in any of my travels."

PROGRESSES OF QUEEN ELIZABETH.

No. IX.—1576-1577.

EARLY in 1576 there was much discussion amongst the attendants of the court as to the direction of the Progresses; but though several plans appear to have been entertained by the Queen, none were carried into effect. At length, on July 30, she removed from Hampton Court to Havering. On August 24 a letter is written to Sir William More, of Loseley House, near Guildford, stating—"it is thought the Queen will not come to your house this summer. She removes to-morrow to Hatfield from Hertford, and there remaineth it is not known how long, and so to St. Albans [probably to Gorhambury], then to Chenies [the Earl of Bedford's], or to Mr. Sands's house [the Vine, in Hampshire], and to Reading, and there remaineth during her pleasure, for my Lord Treasurer told me that he heard the plague was about Oatland." We may suppose Sir William More did not greatly regret his disappointment, if we may judge from a letter of Sir Anthony Wingfield, addressed to him at some time between 1569, when the Queen visited him twice in the month of August, and the present year. Sir Anthony says—"After I had advertised my Lord Chamberlain what few small rooms and how unmeet your house was for the Queen's Majesty, he did this day show it unto her Majesty, and thereupon [she] determined to go to the manor-house [in Guildford Park], and now upon the sudden is changed, and is determined to come to your house, and for that it shall not [be] a great trouble and hindrance unto you, [I] have spoken with my Lady Clinton in your cause,

and she doth think it good that you should come and declare unto my Lord of Leicester your estate, that her Majesty might not come unto your house." Loseley House is yet standing, and is a mansion of considerable magnitude. There must have been many far less adapted for the reception of a court, to which, however, visits were paid; but Sir William was probably wearied of his distinctions. He had, as is before mentioned, entertained her twice, and had also been entrusted with the custody of Henry Wriothesley, Earl of Southampton, a trust which continued for three years, and of which he loudly complained, as independent of the cost, he was himself as much confined to his house as his prisoner, and "could neither visit out nor travel." In September we find the Queen at Windsor.

On the 14th of May, 1577, the Queen was at Theobalds, and on the 18th she visited Sir Nicholas Bacon at Gorhambury, where she remained for six days, at a charge, as recorded by the Lord Keeper himself, amounting to [illegible]. Some of the items are curious. There were eight oxen, [illegible], sixty sheep, [illegible] calves, [illegible] thirty-four lambs, [illegible] birds, 2*l.* 10*s.* The gross sum for poultry and game was [illegible] twenty-five bucks and [illegible] which the sum is affixed [illegible] 7*s.* 11*d.* [illegible] twelve dozen and [illegible] 20*l.* 13*s.* [illegible] and thirteen [illegible] [illegible] of which there were [illegible] dozen and nine [illegible] cream, [illegible] of [illegible] [illegible] broken or [illegible], and [illegible] [illegible].

This was the only visit except [illegible] the summer, but it had been expected that she would have visited the counties of Kent, Surrey, and Sussex. Lord [illegible] to receive her, and wrote to the Lord Chamberlain and the Earl of Sussex on the 4th July, beseeching to know when the Queen would arrive at Lewes, and how long she would tarry there, so that he, having already sent into Kent, Surrey, and Sussex for provision, he found [illegible] possessed by my Lord of Arundel, my Lord Montague, and others, so as to [illegible] he was to send into Flanders, which he would speedily do if the time of her Majesty's coming and [illegible] were certain.

The next visit that was made was to the unwilling Sir William More at Loseley. Of this visit we have no account, but Henry Goring, Esq., of Burton, in Sussex, wrote to him on July 30, that hearing the Queen had [illegible] at Loseley, and intended to [illegible] [illegible] at his house in Sussex, he [illegible] how [illegible] to entertain her, whether she brings her own stuff [illegible] [illegible] provisions, or whether Sir William provided every part. He, however, escaped the infliction, and the Queen appears to have spent the remainder of the summer at Greenwich.

Early in 1578 the Queen visited John Lacy, Esq., citizen and clothworker, at his seat at Putney. He lived in a spacious ancient mansion, which had belonged to the Waldecks, and repeated her visits oftener than to any other of her subjects. She was here again twice in 1579, and once in 1580; she stayed two nights in 1582, one night in 1584, and two nights in 1585; she repeated her visit in 1589, dined there thrice in 1590, stayed three days in March 1597, one night in the same year, and two nights in 1601, and in 1603 only two months before her death she dined there.

Early in May her Majesty visited Lord Compton at Tottenham; thence she proceeded to Theobalds, where she remained two or three days with the Lord Treasurer. She then visited Mr. Butler, at Stanstead Abbots, and Mr. Parrett of Bell House, on her way to Wanstead, the seat of the Earl of Leicester. Here she was presented with an interlude written by Sir Philip Sidney, the subject of which is a contention between a forester and a shepherd for the May-lady, and which is printed in his works.

In July we find her again at Theobalds, next at Standon, in Hertfordshire, the seat of Sir Ralph Sadler, and after one or two removes she reached Audley End on the 26th of July, where, by arrangement, a deputation from the University of Cambridge waited on her. They had previously announced to Lord Burghley, then chancellor, their desire of doing so, wishing to hold a disputation before her, and to present her with a book, to which he assented, but added, "that they must have regard that the book had no scent of spyke, which commonly bookbinders did seek to add to make their books savour well, for that her Majesty could not abide such a strong scent. That they should do well to provide for the Earl of Leicester, the Lord Chamberlain, and the Earl of Oxford some gloves, with a few verses in a paper joined to them proper to every of their degrees, so that in number they exceeded not above eight verses. That for himself he could spare them, so that others might have them; and that if Mr. Vice-Chamberlain (Hatton) might have a pair with some verses, it should do well to conciliate his good will, being a lover of learned men." The scenting of books is a curious fact in bookbinding; did her Majesty's dislike to such strong scents put the custom wholly out of fashion?

The advice was followed, and all took place accordingly, on Sunday the 27th, but after the oration and the presents, the Queen graciously thanked them, promised her protection and [illegible], but she was weary, hot, and faint after her journey, [illegible]. After the scholars had been welcomed with beer and wine, the disputation was carried on for three hours in the chamber of the Earl of Leicester, and so the scholars, honourably dismissed, returned home to Cambridge that night about midnight, for in Walden they could get no lodging.

We next find the Queen on her road to Norwich. Churchyard, whom we have already quoted, has left an account of the entertainment of the Queen's Majesty into Suffolk and Norfolk. He says—"There were two hundred young gentlemen, clad all in white velvet, and three hundred of the graver sort, apparelled all in black velvet coats and fair chains, all ready at one instant and place, with fifteen hundred serving men more on horseback, well and bravely mounted, in good order, ready to receive the Queen's Highness into Suffolk, waiting on and accompanying her till she left the county. Her first stay was at Long Melford, the seat of Sir William Cordall, Master of the Rolls, whence, on the morning of August 5, she rode to Lawshall Hall, near Bury, the seat of Sir William Drury, "who made her Highness a costly and elegant dinner," and in the evening arrived at Hawsted, another seat of Sir William's. On the 7th of August she was at Bury, and on the 10th at Mr. Edward Rookwood's, Euston Hall, near Thetford, who was a relative of the Ambrose Rookwood subsequently executed for his share in the Gunpowder Plot. On entering Norfolk she was met by five and twenty hundred horsemen, whereof [illegible] there were six hundred gentlemen, so bravely attired and mounted as indeed was worth the [illegible]. Banquets and feasts began here, which the Earl of Surrey did show most sumptuously [illegible] Kenninghall were [illegible] much com-

mended." On the 16th she dined at Bracon Ash, and in the afternoon, at the boundary of the city jurisdiction and the county, was received by Mr. Downes, the lord of the manor, which was held by petit-serjeanty, the terms of which he recounted to her in verse.* The mayor and corporation, "all in one suit and one sashing," with "threescore of the most comely young men of the city, as bachelors, apparelled all in black satin doublets, black hose, black taffeta hats and yellow bands, and their universal livery was a mandylion of purple taffeta laid about with silver lace," with a noble company of gentlemen and wealthy citizens, met her at the same spot, known as Hartford Bridge, presenting her with a silver cup and cover, gilt, containing one hundred pounds in gold, and welcomed her with a Latin oration, to which she graciously answered in English, and bade the gentleman to whom the cup was delivered, "Look to it, there is a hundred pound." They then proceeded towards the city, where, "within a flight shot," they were met by one "which represented King Gurgunt, sometime King of England, which builded the castle of Norwich, called Blanch Flowre, and laid the foundation of the city." He was to have addressed the Queen in a poetical speech, but, "by reason of a shower of rain which came, her Majesty hasted away, the speech not uttered," which is, however, given in the narrative. St. Stephen's gate was handsomely ornamented, and the first pageant was exhibited a short way within it. A part of it was very appropriate to the town. "It was beautified with painters' work, artificially expressing to sight the portraiture of these several looms, and the weavers in them (as it were) working, and over every loom the name thereof, viz. over the first loom was written, 'the weaving of worsted;' over the second, 'the weaving of russels;' over the third, 'the weaving of darnir;' over the fourth, 'the weaving of tuft-mockado;' the fifth, 'the weaving of lace:' the sixth, 'the weaving of taffa;' the seventh, 'the weaving of fringe' [The names of some of these articles seem to have been as fantastic as those frequently given to similar manufactures now; tuft-mockado and darnir may match with gros de Naples and ducape]. And then was there the portrait of a matron and two or three children, and over her head was written these words—'Good nurture changeth qualities.' Upon the stage there stood at one end eight small women-children spinning worsted yarn, and at the other end as many knitting of worsted yarn hose; and in the midst of the said stage stood a pretty boy, richly apparelled, which represented the commonwealth of the city. And all the rest of the stage was furnished with men which made the said several works, and before every man the work indeed." The "commonwealth" addressed some explanatory and complimentary verses to her Majesty, who was much pleased with the show, and "particularly viewed the knitting and spinning of the children, perused the looms, and noted the several works and commodities which were made by those means." The second pageant was far less interesting; it was placed in the street at the entrance of the market. On an ornamented stage were five female figures, representing the City of Norwich, Deborah, Judith, Esther, and Martia, "sometime Queen of England," being daughter-in-law, as she herself informs us, of the Gurgunt before introduced. All these personages recite poetical addresses more remarkable for their extravagant adulation than for any superior quality. As a sufficient specimen, the City of Norwich says—

"Thou art my joy next God, I have none other,
My princess and my peerless queen, my loving muse and mother.
My goods and land, my hands and heart, my limbs and life are thine;
What is mine own in right or thought, to thee I do resign."

She then passed through the richly-decked streets to the cathedral, where she heard Divine service, and then took up her abode in the Bishop's palace.

On the following days, during all the time of her stay, she was entertained with orations, pageants, and masques, full of conceits, heathen mythology, and compliments, in Greek, Latin, and English, but not offering anything demanding extract. On Friday she left Norwich, a group of fairies meeting and addressing her on her way, and reached Kimberley, the seat of the Wodehouses that night, where she rested, and where the throne erected for her in the great hall is still preserved. She then visited Wood Rising, the residence of Sir Robert Southwell; Sir Edward Clere, at Thetford; Sir Thomas Kidson, at Hengrave Hall; Master Revett, at Chippenham, in Cambridgeshire; Lord North, at Kirtling, where she was splendidly entertained; Sir Giles Allington, at Horseheath; Sir John Cutts, at Childerley; Master Capel, at Hadham Hall, in Hertfordshire; Sir Thomas Jocelyn, at Hide Hall, near Sawbridgeworth; Master Brown, at Rookwood Hall, in Rothing Abbess, Essex; Master Stoner, at Loughton, and thence to the Earl of Leicester's, at Wanstead, where, on the 20th of September, his marriage with the Dowager Countess of Essex had been solemnized, "and, to knit up all, the good cheer was revived, not only with making a great feast to the Queen and the French ambassador," but also in feasting the Queen's guard at his own table as a mark of his high respect; and here ended the Progresses for this year.

* A curious sequel is recorded of these visits as regards Mr. Rookwood and Mr. Downes. They were both Catholics; and a Richard Topelyffe, who seems to have been a most zealous opponent of that faith, in a letter to the Earl of Shrewsbury, dated August 30 of this same year, thus speaks of them:—"The next good news (but in account the highest), her Majesty hath served God with great zeal and comfortable examples: for by her council two notorious papists, young Rookwood (the master of Euston Hall, where her Majesty did lie upon Sunday now a fortnight) and one Downes, a gent., were both committed, the one to the town prison at Norwich, the other to the county-prison there, for obstinate papistry," with seven others, whom he mentions, "for badness of belief." "This Rookwood," he adds, "is a papist of kind newly crept out of his late wardship. Her Majesty, by some means I know not, was lodged at his house, Euston, far unmeet for her Highness, but fitter for the blackguard; nevertheless (the gentleman brought into her Majesty's presence by like device) her excellent Majesty gave to Rookwood ordinary thanks for his bad house, and her fair hand to kiss; after which it was braved at: but my Lord Chamberlain, nobly and gravely understanding that Rookwood was excommunicated for papistry, called him before him; demanded of him how he durst presume to attempt her real presence, he, unfit to accompany any Christian person." The unfortunate gentleman was then committed: his house was ransacked, under a frivolous pretext of a piece of the Queen's plate having been missed during her stay there, when an image of "our Lady" was found in a hay-rick, which, "for greatness, for gayness, and workmanship, I did never see a match;" this image the Queen "commanded to the fire, which, in her sight, by the country-folk was quickly done, to her content, and the unspeakable joy of every one but some one or two who had sucked of the idol's poisoned milk." The unfortunate Rookwood was afterwards fined heavily for his crime in presuming to "attempt her real presence," and ultimately died in Bury gaol, in June, 1598: the necessities of his family compelled them subsequently to dispose of the property of Euston.

Lucifer Matches.—A witness before the Children's Employment Commission stated that he used a thousand pounds' worth of American pine yearly in making Lucifer boxes, of which he believed from twelve to fifteen thousand gross were made every week in London; and as each box contains 50 matches, the yearly consumption would amount to 5000 millions



[Portrait of Benozzo Gozzoli, and Dancing Figures from the Campo Santo.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XIV.

Benozzo Gozzoli: b. 1406, d. 1478.

Fra Giovanni Angelico possessed among his other amiable qualities, one true characteristic of a generous mind, the willingness to impart whatever he knew to others; and notwithstanding the retirement in which he lived, he had several pupils: but that which formed the principal charm and merit of his productions, the impress of individual mind, the profound sentiment of piety, was incommunicable except to a kindred spirit. Hence it is that his influence, like the Prophetic mantle, fell on those who had the power to catch it and retain it, and is more apparent in its general results, as seen in the schools of Umbria and Venice, than in any particular painter or any particular work. Cosimo Roselli, a very distinguished artist of that time, is supposed to have studied under Angelico, and certainly began by imitating his manner: afterwards he painted like Masaccio. His best work, a large fresco in the Chapel of St. Ambrogio at Florence, is engraved in Lasinio's collection from the old Florentine masters. It was executed about 1456. A much more celebrated name is that of Benozzo Gozzoli.

We know very little of the life of this extraordinary man; but that little shows him to have been worthy of the particular love of his master, whose favourite pupil and companion he was, and, during the last years of Angelico's life, his assistant. According to Vasari, Benozzo was an excellent man, and a good and pious Christian, but he had no vocation for the cloister. No painter of the time had such a lively sense of all the beauty and variety of the external and material world. For him beauty existed wherever he looked—wherever he moved. He took such delight in the practice of his art, that he had little time for other pursuits. He succeeded to the popularity of Angelico as a painter of sacred subjects, into which he introduced much more ornament, decorating them with landscapes, buildings, animals, &c. It appears that he did not design the figure more correctly than Angelico, nor equal him in the profound feeling and celestial air of his heads, but he has shown more invention and variety in his compositions, and mingled with his grace a certain gaiety and movement and dramatic feeling which is not seen in the works of Angelico.

Benozzo, before the death of his master, painted some frescoes in the cathedral at Orvieto, and in the churches of the little town of Montefalco near Foligno, and also at Rome in the church of the Ara-celi. The former remain, but those in the Ara-celi have long since been destroyed. All these were more or less in the style of his master. After the death of Angelico, Benozzo

was employed to paint the church at San Gemignano, a little city on the road from Florence to Sienna; and here some of his own peculiar characteristics were first displayed: here he painted the Death of St. Sebastian, and the history of St. Augustin; and for Pietro de' Medici he painted a chapel in the palace of the Medici (now the Palazzo Riccardi at Florence), the subject being the Adoration of the Magi, which still exists in the Ricardi Palace but so built up that it can only be viewed by torch-light. In all the paintings he executed at this time (1460) and afterwards, Benozzo introduced many figures, generally the portraits of distinguished inhabitants of the place, or those of his friends, grouped as spectators round the principal incident or personage represented, having nothing to do with the action, but so beautifully managed, that, far from appearing intrusive, they rather add to the solemnity and the poetry of the scene, as if he would fain represent these sacred events as belonging to all times, and still, as it were, passing before our eyes. He has carried this peculiarity, as well as other characteristics of his own original style, still farther in his greatest work, the decoration of the Campo Santo.

When the troubles of war, famine, plague, and intestine divisions, which had distracted Pisa during the first half of the fifteenth century, had subsided, the citizens of that rich and active republic resumed those works of peace which had been interrupted for nearly a century, and resolved to complete the painting of their far-famed cemetery, the Campo Santo.* One whole side, the north wall, was yet untouched: they intrusted the work to Benozzo Gozzoli, who, though now old (upwards of sixty, and worn with toil and trouble), did not hesitate to undertake a task which, to use Vasari's strong expression, was nothing less than "*terribilissima*," and, enough "to frighten a whole legion of painters." In twenty-four compartments he represented the whole history of the Old Testament from Noah down to King Solomon. The endless fertility of fancy and invention displayed in these compositions; the pastoral beauty of some of the scenes, the scriptural sublimity of others; the hundreds of figures introduced, many of them portraits of his own time; the dignity and beauty of the heads; the exquisite grace of some of the figures, almost equal to Raphael; the ample draperies, the gay rich colours, the profusion of accessories, as buildings, landscapes, flowers, animals, and the care and exactness with which he has rendered the costume of that time—render this work of Benozzo one of the most extraordinary monuments of the fifteenth century. But it would have been more than extraordinary, it would have been *miraculous* had it been executed in the space of two years, as Lanzi relates—trusting to a popular tradition which a moment's reflection would have shown to be incredible. It appears from authentic records still existing in the city of Pisa, that Benozzo was engaged on this great work not less than sixteen years, from 1468 to 1484.

Those who would form an idea of its immensity, considered as the work of one hand, may consult the large set of engravings from the Campo Santo, published by Lasinio in 1821.

The original frescoes are still in wonderful preservation. Three out of the twenty-four are almost entirely destroyed; the others have peeled off in some parts, but in general the expression of the features, and the lucid harmony of the colours have remained. Each compartment contains many incidents and events artlessly grouped together. Thus we have Hagar's presumption, her castigation by Sarah, the visit of the three angels, &c., in one picture. Among the most beautiful subjects may be mentioned the Vineyard of Noah, the first which Benozzo painted, as a trial of his skill. On the left of this composition are two female figures—one who comes tripping along with a basket of grapes on her head, the other holding up her basket for more—which are perfect models of pastoral grace and simplicity. In the Building of the Tower of Babel a crowd of spectators have assembled to witness the work; among them are introduced the figures of Cosmo de' Medici, the father of his country, and his two grandsons Lorenzo and Giuliano, with Poliziano and other personages, all in the habit of that time. In the Marriage Feast of Jacob and Rachel, he has introduced the two graceful dancing figures which illustrate this essay. In the Recognition of Joseph he has painted a profusion of rich architectural decoration—palaces, colonnades, balconies, and porticoes in the style of the time; and in the distance we have, instead of the Pyramids, a view of the Cathedral of Pisa!

Soon after the completion of the last compartment, the Queen of Sheba's Visit to Solomon (of which unhappily scarce a fragment remains), Benozzo Gozzoli died at Pisa, in his 78th year. The grateful and admiring Pisans, among whom he had resided for sixteen years in great honour and esteem, had presented him, in the course of his work, with a vault or sepulchre just beneath the compartment which contains the history of Joseph, and in this spot he lies buried, with an inscription purporting that his best monument consists in the works around. Benozzo left an only daughter, who after his death inherited the modest little dwelling which he had purchased for himself on the Carraia di San Francesco.

Benozzo's principal works, being in fresco, remain attached to the walls on which they were painted. Those only of the Campo Santo are engraved. A picture in distemper of St. Thomas Aquinas is in the Louvre (No. 1033), and is the same mentioned by Vasari as having been painted for the Cathedral of Pisa.

[To be continued.]

* For a full description of the Campo Santo see ante, p. 145.

ECONOMICAL USES OF THE OAK.

[Continued from page 298.]

THERE is a species of oak, which, until the discovery of cochineal, attracted much notice as being the tree which fed the insect called *kermes*, by which a beautiful scarlet dye was produced. The parasitic insect has all the appearance of a berry or seed, affording, towards the close of its existence, not the slightest indication of its insect nature, being immoveably affixed in clusters to the branches of the oak, upon which it subsists, by introducing into the substance of the stem a long and delicate "haustellum," or piercer.

The kermes was know to the Phœnicians, before the time of Moses, under the name of *tola* or *thola*; at a later period it was known to the Greeks by the name of *coccus*; and afterwards to the Romans under that of *cocum* or *coccus baphica*, whence the origin of the terms 'coccus' and 'coccinum,' which were given to cloth dyed with kermes; whilst persons wearing this kind of cloth were said by the Romans to be 'coccinati.' The peculiar appearance which the kermes presents had the effect for many centuries of preventing its real character from being discovered. By some of the early naturalists it was regarded as the fruit of the oak-tree, upon which it is found; while others supposed that it was a vegetable excrescence similar in its nature to the *galls* of other oaks (of which we shall speak presently). In 1714, however, M. Cestoni advanced the opinion that the kermes was an insect; and this was confirmed soon afterwards by MM. Gandel and Emeric.

In its natural state the kermes has a shining appearance, and a plum colour covered with a whitish bloom. In the state in which it is brought into the

market it appears of a dull reddish-brown, which is not the natural colour, but is imparted to it by steeping in vinegar. The crop of kermes is more or less abundant according to the state of the preceding winter: when, therefore, there has been no frost, and the weather has been generally mild, a good crop is expected; and as there is no trouble in planting or attending to the growth of the kermes, or of the oak on which it grows, and as no other instruments are required than long nails to the fingers, the harvest is a very inexpensive one. Females are employed in collecting the kermes in the morning, before the dew is off the ground; at which time the prickles of the plants are less to be dreaded. Experienced persons will thus collect a couple of pounds' weight in a day. The price decreases considerably during the gathering, in consequence of the latest collected kermes being lighter than those first obtained, owing to the young ones having escaped. The merchants steep the kermes in vinegar, which imparts to them the valuable scarlet colour.

Some of the varieties of oak owe their value, or a portion of it, to certain excrescences arising from diseases to which the trees are subject. One of these is the *Gall-Oak*, or Quercus Infectoria, which yields the valuable substance *nut-galls*. This oak is very common in Asia Minor; but till the time of the traveller Olivier, Europeans had very little information on the subject, although the galls constituted a considerable article of commerce. It is a shrub, seldom exceeding six feet in height; and the gall is a morbid excrescence produced on it by the puncture of a winged insect. This excrescence is of a globular form, about the size of a boy's marble, and having an irregular surface. It is developed on the young shoots of the tree, and contains within it the eggs which the insect has deposited. The female insect is provided with a sharp piercer or borer, with which she makes a hole in the twigs of the young tree, and in this hole she deposits her eggs. Shortly after this, the galls are formed in the outside of the attacked part; the eggs being forced from the place where they were originally deposited, and occupying the centre of the newly formed gall, which is generally of a fleshy nature, and serves as food to the young grub when hatched. The pupa state succeeds, and is passed either within the gall or in the earth; in the latter case, the larva having, previous to its change, eaten its way out.

The effect produced upon the tree by this deposition of eggs is analogous to the tumour and inflammation of an animal body. The cellular tissue swells; the parts which were naturally long become round; and the flow of liquid matter produces a change of organization from which results a complete change in the external form. A gall from which the insect has escaped contains less astringent principle than one which has its interior less consumed by the insect, which still remains enclosed therein. Hence it is that there are two kinds of gall-nuts known in commerce: those which still contain the insect, and which are known in the trade under the names of black or blue galls, and green galls, and termed *yerli* by the natives of the countries where they are collected; and those from which the insect has escaped, and which are called white galls. The latter contain not more than two-thirds of the astringent qualities of the former, and are of a pale brown or whitish colour, less compact, and not so heavy. The white and blue galls are generally sold mixed together in about equal proportions, and are then called 'galls in sorts;' and occasionally fraud is attempted by dyeing the white galls with a blue dye, but their lighter weight renders detection easy. Mr. M'Culloch says:—"These galls are principally exported from Aleppo, Tripoli, Smyrna, and Said; those brought from the first chiefly come from Mosul, on the western bank of the Tigris, about ten days' journey from Aleppo. The real Mosul galls are unquestionably the best of any; but all that are gathered in the surrounding country are sold under this name. Those from Caramania are of a very inferior quality. The gall-nuts met with in India are carried thither from Persia by Arabian merchants. The price of galls in the London markets varies from 65s. to 85s. per cwt. The duty is 5s. per cwt."

The British oak does not bear a gall-nut of such powerful qualities as that of the gall-oak; but, like the galls of commerce, those British galls are said to be the best from which the insect has not escaped. The largest species of British galls is the *oak-apple*, so well known in this country. These galls are astringent, like the Aleppo galls, and may be used like them in dyeing, ink-making, &c., but not so advantageously. How the oak apple came to be associated with the 29th of May, "King Charles's day," is familiar to every one. There is a passage in Gerard's 'Herbal,' which seems to show that the oak-apple was formerly employed as an augury. "The oke-apples being broken in sunder about the time of their withering doe foreshew the sequell of the yeare, as the expert Kentish husbandmen have observed by the living things found in them; as, if they finde an ant, they foretell plenty of graine to ensue; if a white worm, like a gentill or magot, then they prognosticate murrain of beasts and cattell; if a spider, then (say they), we shall have a pestilence, or some such like sickenesse to follow amongst men. These things the learned also have observed and noted: for Matthiolus, writing upon Dioscorides, saith that, before they have an hole through them, they containe in them either a flie, a spider, or a worme: if a flie, then warre insueth; if a creeping worme, then scarcitie of victuals; if a running spider, then followeth great sicknesse or mortalitie."

Mr. London remarks that these opinions are not altogether so absurd as might at first be supposed: for diversity of season will affect these excrescences; and, if it be retarded, the egg, the larva, or perfect cynips, may be detected; and often, instead of the true gall insect, the ichneumon is found within the tumour: not that this fly has subsisted on the substance of the gall; but the parent ichneumon having deposited an egg within the gall while soft, the former inmate is preyed upon by the parasite, and the interloper becomes possessed of the other's abode.

On the subject of these galls, oak-apples, and similar excrescences of the oak, and the instincts of the little creatures which produce them, the author of the 'Journal of a Naturalist' remarks:—"The insect that wounds the leaf of the oak, and occasions the formation of the gall-nut, and those which are likewise the cause of the apple rising in the sprays of the same tree, and those flower-like leaves on the buds have performed very different operations, either by the instrument that inflicted the wound, or by the injection of some fluid to influence the action of the parts. That extraordinary hairy excrescence on the wild rose, likewise the result of the wounds of an insect, resembles no other nidus required for such creatures that we know of; and those red spines on the leaf of the maple are different again from others. It is useless to inquire into causes of which we probably can obtain no certain results; but, judging by the effects produced by different agents, we must conclude that, as particular birds require and fabricate from age to age very different receptacles for their young, and make choice of dissimilar materials, though each species has the same materials to effect it, where, generally speaking, no sufficient reasons for such variety of forms and tex-

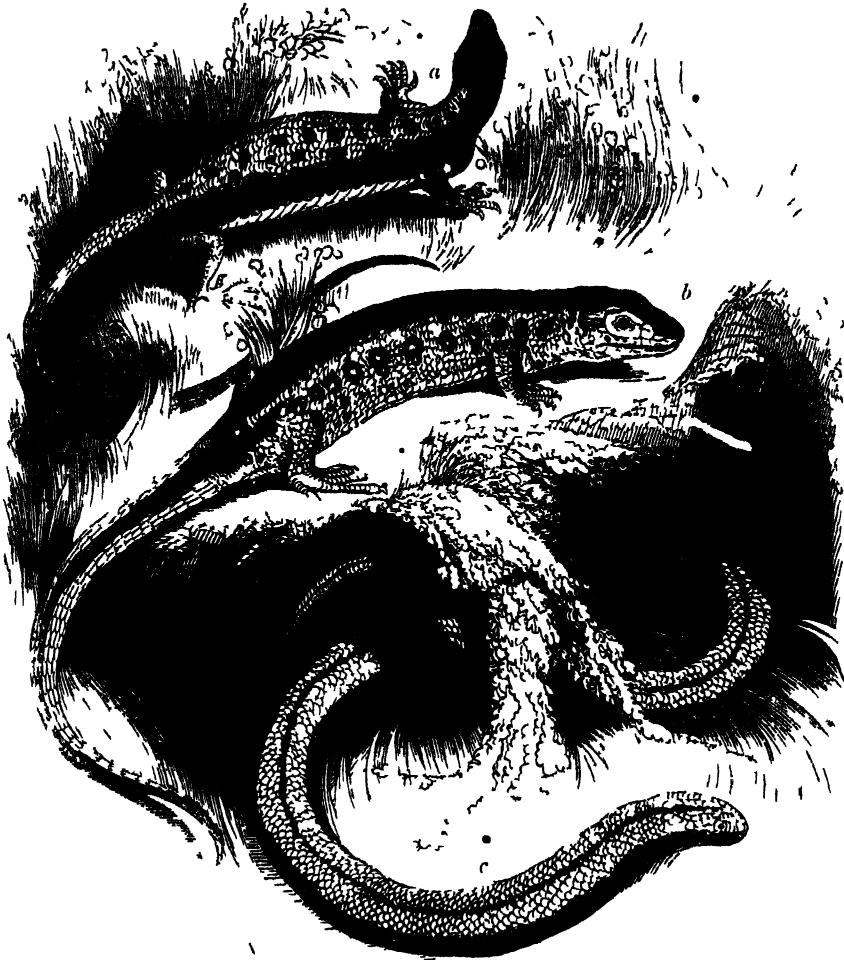
ture is obvious; so is it fitting that insects should be furnished with a variety of powers and means to accomplish their requirements, having wants more urgent, their nests being at times to be so constructed as to resist the influence of seasons, to contain the young for much longer periods, even occasionally to furnish a supply of food, or be a storehouse to afford it when wanted by the infant brood."

It will be a fitting sequel to these details, to notice the extraordinary opinions held in past times concerning the *barnacles* of the oak. The word itself has been supposed to be derived from *bairn*, a child or offspring, and *aac* or *acle*, the oak, signifying the "child of the oak." Numerous allusions have been made to it by the early writers. Thus, Munster, in his 'Cosmography,' says:—"Certain trees grow in Vimonia, near Scotland, towards the north, whose fruit, falling into the water, is turned into a bird." Guadaguigna, an Italian writer, affirms the like of the leaves of a tree; while Ruillius mentions trees that "bear cockles, of which birds are produced." A French writer alludes to "those trees of the Hebrides, the wood whereof, being rotted in the sea, is turned into birds like ducks." Gerard goes into detail in the matter, thus:—"There are found in the north of Scotland, and islands adjacent, called Orchades, certain trees whereon do grow certain shells tending to russet, wherein are contained little living creatures; which shells, in time of maturitie, do open, and out of them do grow those little living things, which, falling into the water, do become fowles, which we call *barnakles*; in the north of England *brant-geese*; and in Lancashire *tree-geese*; but the other that do fall upon the land, perish, and come to nothing." Gerard does not say that he *saw* the shells "fall from the trees," nor the fowles come out of the shells; but he seems to have religiously believed both; and adds a statement, respecting the barnacles in the oaken timbers of a ship, which he brings forward as an unimpeachable argument. "There is a small island in Lancashire, called the Pile of Foulders, wherein are found the broken pieces of old and bruised ships, some whereof have been cast there by shipwracke; and also the trunks and bodies, with the branches, of old and rotten trees, cast up there likewise; whereon is found a certain spawn or froth, that in time breaketh into certain shells, in shape like those of the muskle, but sharper pointed, and of a whitish colour, wherein is contained a thing in form like a lace of silke, finely woven as it were together, of a whitish colour, one end whereof is fastened unto the inside of the shell, even as the fish of oysters and muskles: the other end is made fast unto the belly of a rude mass, or lumpe, which in time cometh to the shape and form of a bird. When it is perfectly formed, the shell gapeth open, and the first thing that appeareth is the foresaid lace or string; next came the leg of the bird hanging out; and as it groweth greater, it openeth the shell by degrees, till at length it is all come forth, and hangeth only by the bill; in short space after it cometh to full maturitie, and falleth into the sea, where it gathereth feathers, and groweth to a fowl bigger than a mallard, and lesser than a goose, having black legs, bill or beake, and feathers black and white, spotted in such a manner as our magpie; called in some places a *pie-annet*; which the people of Lancashire call by no other name than a *tree-goose*; which place aforesaid, and the parts adjoining, do so much abound therewith, that one of the best is bought for three half-pence. For the truth hereof, if any doubt, let them repaire to me, and I shall satisfie them by the testimonie of good witnesses." It is difficult to unravel the sources of this absurd jumble of opinions notwithstanding Gerard's "good witnesses" in proof of their truth; but we may safely opine that oak-galls were occasionally seen to fall from the trees; that the contained insects were occasionally seen to emerge from them; that marine animals were seen to cling to the sides of vessels, and were supposed to have sprung from the wood of which the vessels were built; and that these animals had a fringy or hairy substance at the joint of the shell, something like that in the "silk-producing fish" (see 'Penny Magazine,' No. 503), which looked, to ignorant eyes, like the feathers of a bird. These facts, combined with plenty of superstition, exaggeration, and love of the marvellous, may perhaps enable us to explain the notable history of the *barnacle*.

Travelling in Sindh.—The whole surface of Sindh for a greater portion of its extent being cut up into canals and watercourses, its traffic during the inundation of the river is confined to the stream. There are few roads, and the ordinary land-routes are completely impeded during the floods. The poorer natives journeying, therefore, from the upper portion of the river to the lower, are in the habit of committing themselves to the stream, securing their safety by a closed earthern vessel, which they strap round their loins: in this way the Sindhians may often be seen during the height of the inundations, making their way from village to village. It should be remarked, however, that the Mianis and tribes living near the river are as much at home in the water as out of it: they may really be termed amphibious, for with an inflated goat-skin or a common earthen jar they cross the stream during its most turbulent season or at its greatest breadth.—*Personal Observations on Sindh, &c., by Captain T. Postans.*

White Bait.—Having had an opportunity of seeing the mode of cooking the fish as practised at Lovegrove's at Blackwall, the following notice of the process may not, perhaps, be uninteresting:—I was informed that the fish should be cooked within an hour after being caught, or they are apt to cling together. Those which I saw cooked were contained in water in a pan, from which they were from time to time removed, as required, by a skimmer. They were then thrown on a stratum of flour contained in a large napkin, in which they were shaken until completely enveloped in flour. In this state they were placed in a cullender, and all the superfluous flour removed by sifting. They were now thrown into hot melted lard, contained in a copper cauldron or stew-vessel placed over a charcoal fire. A kind of ebullition immediately commenced, and in about two minutes they were removed by a tin skimmer, thrown into a cullender to drain, and served up by placing them on a fish-drainer in a dish. At table they are flavoured with cayenne and lemon-juice, and eaten with brown-bread and butter; iced punch being the favourite accompanying beverage.—*Pereira's Treatise on Food and Diet.*

Attachment of the Dog.—Does any one doubt the reality of a dog's attachment to his master after death? let him take the following illustration related by Napoleon with reference to one of his great actions in Italy, when he passed over the field of battle before the dead bodies had been interred:—"In the deep silence of a moonlight night (said the Emperor) a dog, leaping suddenly from the clothes of his dead master, rushed upon us, and then immediately returned to his hiding-place, howling piteously. He alternately licked his master's hand, and ran towards us, thus at once soliciting and seeking revenge. Whether owing to my own particular turn of mind at the moment, the time, the place, or the action itself, I know not, but certainly no incident on any field of battle ever produced so deep an impression on me: I involuntarily stopped to contemplate the scene. This man, thought I, perhaps has friends in the camp or in his company, and here he lies forsaken by all except his dog! What a lesson nature here presents through the medium of an animal! What a strange being is man! and how mysterious are his impressions! I had without emotion ordered battles which were to decide the fate of the army, I had beheld with tearless eyes the execution of those operations by which numbers of my countrymen were sacrificed, and here my feelings were roused by the mournful howlings of a dog! Certainly at that moment I should have been moved by a suppliant enemy, I could very well imagine Achilles surrendering up the body of Hector at the sight of Priam's tears."—*Journal of the Private Life and Conversations of the Emperor Napoleon at St. Helena, by the Count de las Casas.*



[a, Viviparous Lizard—Zootoca vivipara. b, Sand Lizard—Lacerta agilis. c, Blindworm—Anguis fragilis.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

Lizards.

How unfortunate are persons who entertain unfounded prejudices against those animals commonly called reptiles, and how reprehensible is the conduct of those who inculcate in children a disgust or aversion towards the "creeping things" of earth, which the ignorant have ever been ready to torment, because they like them not, though "the reason why, they cannot tell." It is not only in the soaring bird upborne on vigorous wings, in the colossal elephant, in the noble horse, or patient camel, that wisdom in creation is displayed, but also, and equally, in the smallest, and, as they are often termed, the most insignificant of the animal kingdom. Happily the day is passed when it was deemed the sign of a weak or puerile mind to inquire into the habits, instincts, and organization of such creatures, and the shafts of misdirected irony were unsparingly launched at the naturalists, whose labours were slighted or neglected, as unworthy serious attention. There yet, however, remains much ignorance, for long-rooted errors are not all at once to be eradicated, which the spread of science only will remove; we have, for example, heard it asserted again and again that the blindworm is poisonous, and we know a gentleman living in the country who affirms and believes that one of his servant-men died in consequence of a bite from that reptile, with the outward characters of which he is well acquainted, but respecting the real nature and disposition of which he is totally mistaken; nor will any argument convince him that it is not venomous, because, as he fancies, he has had proof positive of the contrary. To the little lizard we have heard the same properties attributed; and well do we know how difficult it is to dispossess the mind of a prejudice early imbibed, though utterly indefensible.

We here introduce a group of British Lizards to the notice of our readers, and trust that our remarks upon them may prove not altogether uninteresting. The Lizards, or Sauria (Σαῦρος, a lizard) constitute a numerous assemblage, which throng the warmer regions of the globe, where they tenant woods, waters, mouldering ruins, plains, and deserts. It is in those regions that the most vividly coloured, the most strange in aspect, and the largest and most formidable exist; it is there that the crocodile, or caiman, lurks among the reeds or lashes the river as he darts along in chace of his finny prey; and it is there that multitudes of the smaller tribes invade even the dwellings of man, and lurk in the recesses of his habitation. As we leave these

latitudes, the nursery and stronghold of the reptile race, and advance northwards, we soon arrive at the outskirts, so to speak, of their diminishing numbers, and in the boreal realms perceive that we have passed the border-line of their geographical extension. In our island, for example, we have only two acknowledged species of lizard, and the slowworm (Anguis fragilis), which is, in fact, an intermediate form between the lizards and snakes, but, as we shall show, more nearly allied to the former. With respect to the true snakes, we have only two species, the Common or Ringed Snake (Coluber natrix, Linn.), and the Viper (Pelias Berus, Merrem; Coluber Berus, Linn.).

We need scarcely observe that the Saurian Reptiles are subdivided into many distinct groups, of which some are peculiar to America, others to the old world; but of the old world forms, one only, the restricted lacertine group, gives examples to our island, viz. the Lacerta agilis (L. stirpium, Daudin, and the Zootoca vivipara, Wagler).

The true lizards are covered above by small imbricated scales; a minute plate of bone protects the orbits above the eyes; the top of the head and the temples are covered with plates or scuta; the scales of the tail are long and narrow, and disposed in rings around it; the tongue is long and forked, the under parts are covered with plates, and a distinct collar of scales, larger than those of the throat, passes across the lower part of the same, anterior to the base of the fore-limbs. A row of pores runs down the inside of each thigh. There are generally small teeth on the palate.

Referring to our cut, *a* represents the Viviparous Lizard; *b*, the Sand-Lizard; and *c*, the Slowworm or Blindworm.

The Viviparous Lizard, Nimble Lizard, or Common Lizard (*Zootoca vivipara*, Wagler), constitutes a subgenus, having no teeth on the palate.

Thickets, heaths, sunny banks, and sheltered orchards are the favourite localities of this little lizard, which in all its actions is graceful, prompt, and rapid. In certain spots they seem to abound. Walking in the heat of a summer's day along a sunny bank, covered with furze, in Berkshire, we counted more than a dozen, within the space of a few yards, basking in the rays, and probably watching for their insect food. We caught three or four, by cautiously surprising and rapidly seizing them, but several, notwithstanding all our address, we missed, and one left its tail wriggling in our hand, though we used not the slightest violence, nor ever attempted to retain our hold; it snapped, in fact, like glass, at the slightest touch. It was astonishing to see how rapidly, when alarmed, these agile little creatures gained their burrows, or disappeared from view, diving beneath the intertangled vegetation; they seemed gone in the twinkling of an eye. Not less prompt and rapid were they in catching their prey; the moment an insect came near them, or settled on a leaf within due distance, their bright eyes marked it, the next instant it was seized and swallowed, the act was wonderfully quick and instantaneous. The sight of these animals is indeed very acute; and their hearing appears also to be by no means deficient; we have seen them on the slightest noise, on the snapping of a branch, or a rustle made among the leaves, dart off to their burrows, and after a little time cautiously make their reappearance, and on the least alarm again seek refuge in their retreats.

Unlike most lizards, which produce eggs covered by membrane, and which they deposit in the sand or in other places, to be hatched by the warmth of the sun, the present species brings forth living young, the eggs being hatched while yet within the body of the parent. This species is therefore ovoviviparous. The membrane covering the eggs is very thin, and the female in the month of June passes a great portion of the day basking in the sun, for the sake of the vivifying heat, as necessary for the exclusion of the young from the eggs as if they had been previously deposited in the sand. It is very remarkable that one out of our two true lizards should be thus ovoviviparous, and one out of our two true snakes, viz. the viper, which brings forth living young, and basks in the sun that the same object may be accomplished.

The number of young which the Viviparous Lizard produces is four or five, and are occasionally seen in company with their parent, but whether they are united together by any instinctive attachment is doubtful; the probability is that they keep about the spot where they were born, and where the parent has her burrow, and remove by degrees as they increase in size and strength, for from their birth they are capable of running about, and soon begin to exercise their powers in the capture of prey.

During the winter this, as well as the other British Lizard, hybernates, but whether its torpidity is very profound is not ascertained; it appears early in the spring, and continues active till autumn has far advanced, when it betakes itself to its burrow.

This species, and also the Sand-Lizard, are found in Ireland: with respect to the former, Mr. Bell remarks that on the Continent its range does not appear to be extensive: "It is not," he adds, "found in Italy, nor, I believe, in France, and is very probably confined in a great measure to our own latitude." M. Bibron, however, assures us that it exists both in France and Italy, and that it inhabits Germany, Switzerland, and Russia, as well as the British Islands, preferring mountain districts; and he adds, "M. Tschudi informs us that in Switzerland it frequents, in preference, the forests of dry pines, making its runs under the fallen leaves, and to these it retreats on the appearance of danger. Sometimes, however, it is met with in damp and humid forests. In France it is not so common as the Sand-Lizard, while in England it is the contrary."

The average length of the Viviparous Lizard is six inches; its colour and markings are subject to variation, in general the upper parts are of an olive brown, with a dark brown and often interrupted line down the middle of the back, and a broad longitudinal band down each side, between which and the middle line are black dashes or spots. In the male the under parts are of a fine orange spotted with black; in the female, pale olive grey.

The Sand-Lizard (Lacerta Agilis, Linn.; L. Stirpium, Daudin). This species is much larger than the viviparous lizard, sometimes measuring a foot in length; we have seen specimens upwards of seven inches long, and in the 'Linnæan Transactions' an instance is adduced by the Rev. R. Sheppard, in which the measurement exceeded twelve inches (vol. xvi., 1802).

It is to the labours of several modern naturalists that we owe the extrication of this lizard from much confusion, for the term *agilis*, applied by Linnæus to the present species, has been given in England to the viviparous lizard, and in France and Italy to the wall-lizard, the common lizard of those countries.

The sand-lizard is subject to much variation of colour; indeed, two varieties appear to exist: one, and that the most common, of a sandy brown colour, more or less rich, with obscure longitudinal stripes of a darker tint, and a lateral series of black ocellated spots, each with a white or yellowish dot in the centre; the other variety has the upper parts of a brownish-green, the green being more or less decided, with the same general markings.

The ordinary residence of this species is sandy heaths, and though less rapid in its actions than the viviparous,

is quick and active, and runs with considerable alertness; occasionally it may be seen basking on sunny banks and in verdant spots, and has been observed also near marshes. According to Mr. Bell, it occurs in the neighbourhood of Poole both on sandy heaths and in moist situations, and that able naturalist adds, "It has been stated by a gentleman of my acquaintance, that the brown varieties are confined to the sandy heaths, the colours of which are closely imitated by the surface of the body, and that the green variety frequents the more verdant localities. Be this as it may, and it is a statement which at present I can neither confirm nor dispute, it is certain that these varieties mentioned by Linnæus, and seen by Müller, do exist in the place I have named, and within a comparatively short distance." The Sand-Lizard is common in France, but rare in Italy; it is abundant in the middle districts of Europe, and extends as far north as Sweden and Denmark. It is found in Ireland. According to M. Bibron, it inhabits the plains and hills, but never the mountains of the Continent, and gives preference to the margin of woods, copses, large gardens, and vineyards. Its retreat is a burrow varying in depth, worked out under a matted collection of herbage, or between the roots of a tree; in this burrow it hybernates, having closed the entrance with earth and dried leaves; and does not re-appear till the warm weather has returned. It feeds on insects. On a transient glance of this species running along, it might be easily mistaken for the viper, as Mr. Sheppard says it was by himself, its length and the arrangement of the colours favouring the deception: its movements indeed are serpentine; if seized whilst thus endeavouring to escape, it will turn and bite, and when captured is impatient of confinement, avoids observation, and ultimately dies. It is indeed extremely timid, and, unlike the beautiful Green Lizard (Lacerta viridis) of Southern Europe, never can be rendered familiar.

The Sand-Lizard is ovoviparous, depositing its eggs, to the number of fourteen or fifteen, in hollows in the sand, which it excavates for their reception, and then carefully covers them up, leaving them to be hatched by the rays of the sun. The young on exclusion from the egg are active, and lead at once an independent existence.

The Slowworm, or Blindworm (Anguis fragilis). The passage from the lizard tribe to the serpents is through a gradual series of modifications, which may be regarded as intermediate links of connexion. In these transition forms we find the body elongated, and more or less snake-like, sometimes with the fore-limbs, sometimes with the hind-limbs wanting, and at last with all the limbs absent, or merely rudimentary, and concealed beneath the skin. In other respects, however, they retain their Saurian characters; the jaws are not expansible, as in true snakes; the auditory orifice is not covered over by the skin, and the eyes moreover are defended by true lids, which are altogether wanting in snakes. To this intermediate group of reptiles, termed Saurophidia, that is, lizard-snakes, by Mr. Gray, belongs the Slowworm; which, except in external appearance, is far more intimately allied to some of the lizards than to the serpent.

The Slowworm, as a type of the genus Anguis, may be thus characterized:—body and tail cylindrical and obtuse; all the scales smooth, glossy, imbricate, nearly equal on the upper and under parts; head covered with nine larger plates; limbs reduced to mere rudiments beneath the skin; the mouth is small; the teeth minute, none on the palate; the eyes are small but brilliant.

The Slowworm is found over the greater part of Europe and the adjacent parts of Asia; and it is common in many parts of England, frequenting copses, orchards, old mouldering walls, and banks, where it delights to bask in the sun; it is a sluggish timid creature, and when handled, even roughly, seldom attempts to bite: if it does, its jaws are too small and feeble and its teeth too minute to inflict a wound; scarcely, indeed, does it make any impression, and the opinion that it is venomous is as absurd as it is erroneous. Let those who believe it put it themselves to the test, examine the creature's teeth, try their effect on any small animal, and not give up their common sense to the assertions of the ignorant.

According to Latreille, the food of the Slowworm consists of worms and beetles, to which it adds frogs, small rats, and even toads; but this is a mistake: the undilatable mouth of the slowworm is incapable of taking in such prey, it could no more engulf a frog or rat than could the little viviparous lizard; it feeds to some extent, perhaps, on insects, but more particularly on worms and slugs, especially the latter; as was witnessed by Mr. George Daniel, whose account of the habits of the blindworm, in Mr. Bennett's edition of White's 'Selborne,' is very interesting. "A blindworm" he writes, "that I kept alive for nine weeks, would when touched turn and bite, although not very sharply; its bite was not sufficient to draw blood, but it always retained its hold until released. It drank sparingly of milk, raising the head when drinking. It fed upon the little white slug so common in fields and gardens, eating six or seven of them one after the other. It invariably took them in one position. Elevating its head slowly above its victim, it would suddenly seize the slug by the middle, in the same way that a dog will generally seize a rat by the loins. It would then hold it thus, sometimes for more than a minute, when it would pass its prey through its jaws and swallow the slug head foremost. It refused the larger slugs, and would not touch either young frogs or mice. Snakes kept in the same cage took both frogs and mice. The blindworm avoided the water; the snakes on the contrary coiled themselves in a pan containing water which was put into the cage, and appeared to delight in it. The blindworm was a remarkably fine one, measuring fifteen inches in length; it cast its slough while in my possession; the skin came off in separate pieces, the peeling of the head being completed the last." In a state of nature, however, the cuticle, as in the snake, is shed in one entire everted piece. We have alluded to the brittleness of the tail of the viviparous lizard; the same brittleness characterizes the whole body of the slowworm. When alarmed or irritated, it forcibly contracts all its muscles, and breaks asunder upon the slightest attempt to bend it, or a trifling blow. It was from this circumstance that Linnæus gave it the name of *fragilis*. Like the other reptiles of our island, the blindworm hybernates, making a burrow under decayed masses of vegetation, in the soft earth, working its way to a considerable depth, the glossy smoothness of the scales facilitating its passage. In such burrows, Latreille assures us, it usually lives, coming up for the purpose of breathing, when it raises its head out of its hole, ready to retreat on the appearance of danger. Even in the winter it sometimes does this, though snow may be on the ground, if the sun be shining with a warm, though transient gleam. We have often in summer seen it basking in old hedge-rows, and about old crumbling walls: it is easily captured.

As is the case with the viviparous lizard and the viper, the slowworm produces living young, the eggs being hatched just previously to the birth of the offspring they enclosed. This takes place in June or July. The young vary from six to twelve in number, and when first born are not two inches long; they soon,

however, become active, and creep about in search of minute slugs and worms.

It is from the smallness of its eyes that this reptile has received the name of blindworm; they are, however, bright and quick, and defended by moveable eyelids: the minute teeth are slightly hooked; the tongue is rather broad, not very free, nor bifid, as in the snake, but merely notched at the tip. The general colour is lustrous silvery grey with a tinge of brown; a dark line runs along the spine, and obscure lines or rows of spots are carried down the sides: there is, however, considerable variety. The under parts are of a bluish-black, with white reticulations. The young are of a pale yellowish-grey above, black beneath; there is a little black dot on the top of the head, and another at the back of the head, whence a narrow black line is continued down the spine.

The adults measure from twelve to fifteen inches, but the proportionate length of the tail part varies, sometimes being not half the length of the body, sometimes nearly equalling it. This difference may in a great measure depend on sex, for in the lizards the body of the female is proportionately longer than that of the male.

Such then are the two elegant lizards and the falsely accused slowworm, which, if we except the snakes (of course we do the amphibia, as the frog, newt, &c.), are the only reptiles indigenous in our island. In Guernsey it is asserted that the Green Lizard (Lacerta viridis) exists; but this must not be confounded with the green variety of the Sand-Lizard, which is a distinct species. It is to this variety that Gilbert White, in his 'History of Selborne,' alludes, when, speaking of the reptiles of our island, he says, "I remember well to have seen formerly several beautiful *lacerti* on the sunny sandbanks near Farnham in Surrey; and Ray admits that there are such in Ireland." The continental Green Lizard is often brought in cages to England, and soon becomes familiar, taking flies from the hands of those to whom it is accustomed. As an inmate of greenhouses it has great beauty and usefulness to recommend it.

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XV.

[Continued from page 302.]

Andrea Castagno and Luca Signorelli.

Towards the close of the fifteenth century we find Lorenzo de' Medici, *the Magnificent*, master of the Florentine republic, as it was still denominated, though now under the almost absolute power of one man. The mystic and spiritual school of Angelico and his followers no longer found admirers in the city of Florence, where the study of classical literature, and the enthusiastic admiration of the Medici for antique art, led to the cultivation and development of a style wholly different; the painters, instead of confining themselves to scriptural events and characters, began at this time to take their subjects from mythology and classical history: meantime, the progress made in the knowledge of form, the use of colours, and all the technical appliances of the art, prepared the way for the appearance of those great masters who in the succeeding century carried painting in all its departments to the highest perfection, and have never yet been surpassed.

About 1460 a certain Neapolitan painter named Antonello da Messina, having travelled into the Netherlands, learned there from Johan v. Eyk and his scholars the art of managing oil-colours: being at Venice, on his return, he communicated the secret to a Venetian painter, Domenico Veneziano, with whom he had formed a friendship, and who, having acquired considerable reputation, was called to Florence to assist Andrea di Castagno in painting a chapel in Santa Maria Novella. Andrea, who had been a scholar of Masaccio, was one of the most famous painters of the time, and a favourite of the Medici family: on the occasion of the conspiracy of the Pazzi, when the Archbishop of Pisa and his confederates were hung by the magistrates from the windows of the palace, Andrea was called upon to represent, on the walls of the Podestà, this terrible execution—"fit subject for fit hand"—and he succeeded so well, that he obtained the surname of Andrea *degl' Impiccati*, which may be translated Andrea *the hangman*; he afterwards earned a yet more infamous designation—Andrea *the assassin*. Envious of the reputation which Domenico had acquired by the beauty and brilliance of his colours, he first by a show of the most devoted friendship obtained his secret, and then seized the opportunity when he accompanied Domenico one night to serenade his mistress, and stabbed him to the heart. He contrived to escape suspicion, and allowed one or two innocent persons to suffer for his crime, but on his death-bed, ten years afterwards, he confessed his guilt, and has been consigned to merited infamy. Very few works of this painter remain: four are in the Berlin Museum; they are much praised by Lanzi, but, however great their merit, it would be difficult not to look upon them with horror. It is remarkable that none of them are painted in oil-colours, but all are in distemper, as if he had feared to avail himself of the secret acquired by such flagitious means, and the knowledge of which, though not the practice, became general before his death (about 1477).

In the year 1471 Sixtus IV. became pope: though by no means endued with a taste for art, he resolved to emulate the Medici family, whose example and patronage had diffused the fashion, if not the feeling, throughout all Italy; and having built that beautiful chapel in the Vatican called by his name, and since celebrated as the *Sistine* Chapel, the next thing was to decorate it with appropriate paintings. On one side of it was to be represented the History of Moses; on the other, the History of Christ: the old law and the new law, the Hebrew and the Christian dispensation, thus placed in contrast and illustrating each other. As there were no distinguished painters at that time in Rome, Sixtus invited from Florence those of the Tuscan artists who had the greatest reputation in their native country. The first of these was Sandro (*i.e.* Alessandro) Botticelli, remarkable for being one of the earliest painters who treated mythological subjects on a small scale as decorations for furniture, and the first who made drawings for the purpose of being engraved: these, as well as his religious pictures, he treated in a fanciful, capricious style. Six of his pictures are in the Museum at Berlin—one an undraped Venus; and two are in the Louvre. Sandro was a pupil of the monk Fra Filippo already mentioned, and after his death took charge of his young son Filippino Lippi, who excelled both his father and his preceptor, and became one of the greatest painters of his time: he completed the decoration of the Chapel of the Carmine at Florence, left unfinished by Masaccio. Another painter employed by Pope Sixtus was Luca Signorelli of Cortona, the first who not only drew the human form with admirable correctness, but, aided by a degree of anatomical knowledge rare in those days, threw such spirit and expression into the various attitudes of his figures, that his great work, the frescoes of the Cathedral of Orvieto, representing the Last Judgment, were studied and even imitated by Michel Angelo. He must have been a favourite of Fuseli, whose compositions fre-

quently remind us of the long limbs and animated, but sometimes exaggerated action of Signorelli.



[Musician Angel, by L. Signorelli, from the Chapel in the Duomo at Orvieto.]

THE "GANG-SYSTEM" OF AGRICULTURAL LABOUR.

In the Reports of the Special Assistant Poor-Law Commissioners 'On the Employment of Women and Children in Agriculture,' there is an account, by Mr. Denison, of a practice established at Castle Acre, Norfolk, and which originated about seventeen years since, that differs so much from the general custom in all other parts of the kingdom, in reference to agricultural labour, as induces us to think that a short description of it will be interesting to many of our readers.

Castle Acre is surrounded by a number of parishes which are owned by one or two, or at most very few proprietors, who, in order to keep down the poor-rates, have not only not built new cottages for the accommodation of labourers, but allowed the old ones to fall to ruin. These parishes therefore must obtain their labourers elsewhere. Castle Acre, on the other hand, is in the hands of a considerable number of proprietors, and builders have availed themselves of the deficiency of dwellings in the neighbouring parishes to obtain exorbitant rents for very wretched cottages, which are inhabited by persons who do not belong to the parish, but have been driven into it by the custom just mentioned. At present there are in Castle Acre forty-nine labourers and their families who belong to the parish, and one hundred and three labourers with families belonging to other parishes. The gang-system of employment arose therefore from the deficiency of labour in the neighbouring parishes and its excess at Castle Acre. When 'hands' were wanted, they could be easily obtained at Castle Acre, and the object of those seeking employers and those requiring labourers would in such a state of things be facilitated by a 'gangsman,' who became a middle-man between the two classes.

When the custom was once in operation, labourers were drawn to Castle Acre from the surrounding districts, in order to get work in the gangs, till at length that parish became, to use the expression of one of the overseers of the gangs, "the coop of all the scrapings in the county: if a man or woman do anything wrong, they come here, and they think by getting among them here they are safe." The practice has spread to other places, but Castle Acre is the place where it is most completely established. The following is Mr. Denison's account of the practical working of the gangsman system: "Suppose a farmer, in or near Castle Acre, wishes to have a particular piece of work done, which will demand a number of hands, he applies to a gang-master at Castle Acre, who contracts to do the work and to furnish the labour. The bargain is made with the gang-master, and it is then his business to make his bargain with the labourers. He accordingly gets together as many hands as he thinks sufficient, and sends them in a gang to their place of work. If the work, as usually happens, is such that it can be done by women and children as well as men, the gang is in that case composed of both sexes, and of all ages. They work together, but are superintended by an overseer, whose business it is to see that they are steady to their work, and to check any bad language or conduct. The overseer usually goes with the gang to the place of work, and returns home with them when they leave off for the day." One gangsman at Castle Acre has one hundred persons in his employment, and four or five overseers, and often pays about 30*l.* a week in wages.

Mr. Denison next examines both the advantages and disadvantages of the custom. 1. The employer gets his work done quickly, effectually, and cheaply. 2. The gang-master, instead of being a labourer, becomes a master, and enjoys more influence and patronage amongst his own class than the ordinary employer of agricultural labour. So important is it to secure his good-will, that he adds to his profits as gang-master the advantages to be derived from selling necessaries to the members of the gang. One gang-master at Castle Acre keeps a flour-shop, and forces all whom he employs to deal with him. As to the employed, Mr. Denison remarks that, in the present state of Castle Acre, the persons who have been drawn to the place would generally be without work but for the gang-system, by which "they are now enabled by great toil to earn some sort of livelihood."

The disadvantages of the practice fall entirely on the employed, and Mr. Denison's statements on this point deserve very serious consideration. 1. The object is to get the largest amount of labour in a given time for the smallest amount of pay. The gang are made to work as if by the piece on their own account, whereas they only receive wages as day-labourers, the gang-master getting the extra profit which the labourer usually derives from piece-work, and which is sometimes as much as 15*s.* a day. 2. The gang-system subjects the labourer to the chance of going through great labour for no pay. The gang-master, for example, engages to pull turnips in a field five miles off; but if, on reaching the place, the weather becomes unfavourable, so that they cannot get upon the land, they have to walk there and back for nothing. In the ordinary state of things, on a farm some sort of in-door employment would be found, or, at all events, they would most probably receive half a day's pay. To the young children the long walks are frequently worse than the work. It is stated that children of six years old sometimes have to walk five, six, or seven miles to their work and then, if it rains, to walk back again

without earning anything. But they may even do some work and still be dismissed without the slightest remuneration; for the day is divided into four parts, and if they are obliged to suspend their labour before any one of the four parts is completed, they get nothing for that part. 3. The gang-system forces children of very early age into premature employment, to the neglect of school instruction. The ordinary age at which the children of an agricultural labourer begin to be of a little use is ten years, and they do not usually obtain permanent employment until two or three years later, so that they are not debarred from the opportunity of attending school. But under the gang-system, which possesses the means of keeping them close at their work by strictness on the part of the gang-master or his overseer, "children are constantly subjected to laborious work at very early ages, four, five, and six." 4. The character of the employed is of no consequence to the gang-master, and hence "all sorts of characters are mixed up in the gang, male and female." Idle and profligate persons, whom no one would employ unless they could be kept under constant superintendence, naturally find a resource in the gangs. The large proportion of females consist of grown-up girls, of whom one of the overseers of the gangs remarked that, "owing to ganging, seventy out of one hundred girls are very imprudent girls—prostitutes." The Rev. R. Gurdon, of Cranworth, says—"In the gangs you will rarely see the married men or old people of either sex. Near me they generally consist of some married women, but more generally of single girls, from sixteen and upwards; many of very dissolute characters; a few idle young men of loose habits, together with some boys and girls of ten or eleven years of age." 5. The place of work is sometimes even ten miles from Castle Acre, and the gangs are sent in waggons and carts. In this case, says a labourer's wife, who strongly objected to the system, although her children were in the gangs—"they *ought* to stop all night; but my husband would not allow it, for they sleep in barns or anywhere. There's pretty work for boys and girls!" 6. Lastly, Mr. Denison objects to the system because "it throws the whole labouring population into the power of the gang-master, who, if he be a low, hard man, illustrates the proverb that no tyranny is so grinding as that of 'a poor man who oppresseth the poor.' He has neither the will nor the power much to amend their condition: he may, on the other hand, exact any amount of toil from them, on any condition he pleases."

On the moral influence of the labour arrangement here described, Mr. Denison says—"I can come to no other conclusion than that it is a very pernicious system, and very destructive of the real elements of happiness to those who are so employed." Mr. Keppel, of Lexham, thinks that the gang-system will and must increase, particularly upon large farms, as the men not in gangs require more looking after than the farmer can afford, to see that the work is not slurred over." If this be so, attention should be directed to the best manner of introducing improvements in the practice. It is mentioned in the Report, that at Holbeach, in Lincolnshire, there are two instances of the gang-system on certainly a better principle than it exists at Castle Acre; married women with their families being chiefly employed, and they are paid by the farmers. At Framlingham, in Suffolk, there are private gangs, the members of which all belong to the same parish, and are superintended by some confidential man, who merely sees that the children do not neglect their work and get into mischief. If the work on very large farms must be done by gangs, these sort of domestic gangs, to be paid by the *farmers*, are very much to be preferred to the slave-driving practice at Castle Acre. The more a domestic character can be given to these associated numbers, the less is the custom likely to be demoralizing. "Castle Acre," says Mr. Denison, "is the most miserable rural parish I ever saw anywhere." If the gang-system were to spread extensively to other parts of the country, the intervention of gang-masters would produce an unhappy separation between the various classes who at present exercise a mutually beneficial influence upon each other's conduct. The power of the gangsman would be a sorry substitute for the combined influences which still penetrate among the rural population, and maintain among them the wholesome feeling that they form a vital part of society. The large farmer, who gets a considerable part of the operations on the land executed by the members of a gang working under overseers, has not so great an interest in the welfare of his 'hands' as the owner of a factory, with its costly machinery and elaborate processes, which renders it of great pecuniary importance that the workpeople should be orderly and efficient, and induced a mill-owner to state that he would not, for 7000*l.*, exchange his present hands, who were distinguished for their intelligence, and whose attachment had been gained by studying to promote their welfare, by providing them with good tenements, schools, and other advantages, for any promiscuous assemblage of workpeople engaged in the same description of manufacture. A body of manufacturing workpeople enjoying even fewer advantages than those here spoken of, possess within themselves the means of improvement to a far greater extent than a band of agricultural labourers isolated from the farmers by the intervention of the gangsman.

THE DANCERS.

By Martin Doyle.

Though not a frequenter of public places in which idle and unedifying amusements alone are practised, nor disposed to look with a lenient eye upon the movements of the waltz or the mazurka, I found myself the other day constituting one of a large assemblage in the midst of which some fantastic-looking couples were revolving their giddy round to the admiration of most of the spectators, who followed with their eager eyes the mazy steps of the performers.

Judging from the style of dress and general appearance of these individuals—both male and female—I perceived at once that they were deficient in good taste, apparently unaccustomed to the conventional habits and manners of well-bred society, and without either elegance or ease in their movements: any dancing-master of reputation would have pronounced them to have been constrained, and very artificial in all their steps and attitudes. And what especially marked the distinction between them and the really elegant ladies and gentlemen who are to be met with in the aristocratic ranks of society, the style of their dress in different particulars was ungraceful. They did not appear at ease in their clothes, but wore them as if unaccustomed to them; just like persons ill at ease in the more polished circles of society—when they but rarely enter—who are perpetually wriggling in their habiliments, pulling their gloves up and down, fumbling with their own fingers, settling their frills or their flounces, their shirt collars or their neckcloths,—according to sex and circumstances—arranging the folds of their gowns, or the disposition of their hair. In short, the party I was contemplating wanted that easy and natural air which is so generally indicative of good breeding, yet I cannot say that they had even the slightest degree of affectation, or any of those preten-

sions to place or precedence which so many persons absurdly arrogate to themselves, to the disgust of all people of common sense and correct judgment.

This simplicity of character in such society as that to which my remarks refer, may appear extraordinary; and the fact that the actors did not seem in any degree to enjoy the scene in which they were engaged, little less so. Let the physiologist explain the apparent phenomena; I deal but with plain realities.

The animal spirits of most persons are quickened and exhilarated by dancing; there are few (at least of the young) who are not animated more or less by the accompanying music and the exercise: the feet, when moving in unison with the notes of a fine band, or even with those of the humble violin or the full-toned pianoforte, have a light and more graceful tread, far different from that which the mere walking animal ordinarily exhibits. The cheek of the youthful maiden too has a mantling blush from the exertion, or the consciousness of being observed; and there is a life and energy in her movements corresponding with the elasticity of her mind. If she be a belle, and a daughter of luxury, she dances just as much or as little as her will or her caprice may dictate; and then, after perhaps a very slight degree of motion, she goes to bed, "unfatigues herself with gentle slumber," and rises with the pleasing certainty that she may repose all day upon a sofa, or drive in an easy carriage to stimulate her languid spirits.

But the dancing portion of the company to which my observations refer, looked not only as if they had never been accustomed to take an airing in an elegant chariot, but as more likely to be *outsides* than *insides* even in a stage-coach, and judging from the strength and peculiar form of the lower limbs which some of them exhibited, I have no doubt that pedestrian motion would have been more appropriate to their real condition than even travelling in the wretched-looking vehicle, drawn by a single horse, which I saw near the scene of the amusement, and in which some of the company arrived.

It is not always just to judge of persons by their appearance, yet there are cases in which it may be harmless to do so—whether this be one of them, the reader may be competent to decide. I do not possess any critical acquaintance with the minutiæ of female attire: the technicalities which appear periodically in the reports of the dresses worn by the gay and the fashionable, the noble and the accomplished, who grace the court of our capital, are to me as enigmatical as the characters of the Chinese language; but any plain man like myself can tell whether a gown be indelicately short, and gaudy in its colours, or in that chaste simplicity of style which characterizes good taste. At the entertainment to which I have been referring, my attention was particularly attracted by one of the females—dare I call her a real lady?—who wore red feathers in a white satin hat, turned up in the front, and rakishly inclining to one side of her head; and instead of having her robe according to the present fashion, so near the ground as to prevent one from seeing whether the wearer has any feet, or is like the Spanish princess who was reported by her major-domo (when a deputation of worthy citizens sent her a present of silk-stockings) to have no legs,—the individual who occupied my momentary attention was dressed in the opposite extreme, such as our ladies adopted a few years ago, with petticoats which scarcely reached to her knees, and a very scanty flounce about an inch or two lower. Over this was a silk robe (much the worse for the wear) of chintz pattern and of every imaginable colour. Then, as she turned round in the waltz and the quadrille, what a bustle! It was the very caricature of those which our would-be fashionable ladies carry—immense in its circumference, protuberant beyond all reasonable limits, as if to conceal some great personal deformity, but of which the wearer seemed little conscious, as I looked upon her with a scrutinizing and yet compassionate glance. Her companions, male and female, were also extravagantly dressed, I may say *ridiculously so*, and the lookers-on seemed to think them grotesque and absurd also. I am quite certain that no one of the men present, however they might have been amused by the exhibition which the female dancers made of their persons, however pleased with their steps and gestures, would have condescended to make a wife of any one of them.

The parties constituting the quadrille set ambled through their prescribed parts just as well, and with as much ear for music, as most people; but their waltzing shocked me: as one of the male sex laid hold alternately of the waist and shoulders of his partner, I was forcibly reminded of the homely expression of the honest young woman who said to her admirer, when he was a little more familiar than her sense of correctness warranted, "Paws off, if you please." The dancers to whom I have just referred, however, met with no such rebuff, and there was, therefore, no end, to the pawing; yet, with all the appearance of hilarity, it seemed to me, that though the limbs moved about in something of a lively measure, the hearts—if they can be said to have any—of the performers were not in those motions; they glided about listlessly, as if they had been jaded with a too frequent repetition of the amusement, or dancing merely to gratify other people, and as if all this apparent gaiety was an affair of compulsion:

> "May not the face with smiles be decked,
> While secret anguish wrings the heart."

Poor creatures! I could not help pitying them as they retired, after the last sounds of the music had ceased, to their seats, which they did without even exchanging a word of courtesy with the groups around or with each other, and looked as if they longed for bedtime.

This is a picture of mankind at large, thought I to myself; what seems pleasure to the unreflecting multitude, is often real misery to the performers themselves: how mistaken are we when we judge by the tinsel presented to us! Here, under a showy dress are probably breaking hearts—simple and natural dispositions thwarted and overruled by an artificial state of things, which all unsophisticated tempers instinctively dislike. And yet, where is the voice of sympathy for the victims of the wearisome round of public life? Where the eye of commiseration? The giddy crowd hasten to what they consider a scene of pleasure; but they see not or else disregard the wires in the background, by which the puppets before them are pulled about, and made irresistibly to sustain a part which, though it may assume to the spectator the character of comedy or farce, is to the actors and actresses themselves deeply tragic in its realities.

But, Reader, I have been too long endeavouring to impose upon your simplicity; it is now full time to explain to you the true nature of the ball to which I have introduced you.

The place of amusement was the principal street in the town of A—— in France; the canopy, the blue sky of Heaven; the master of the ceremonies, an itinerant showman; the performers, six monkeys and as many dogs; the audience, a mixum-gatherum of old and young, rich and poor, gentles and blackguards.

The monkeys performed gymnastics at intervals to relieve the poor dancing-dogs, and these miserable creatures were obliged to remain upright, upon their

hind-legs, until they were ready to drop from exhaustion, and uneasiness, while their tyrant masters compelled them at very short intervals of rest, as long as daylight lasted, to go through their dances, in the unnatural position stated, and with a whip perpetually sounding in their ears. The barrel-organ, with the merry notes of which were associated in the minds of the performers nothing but sensations of pain and endurance, was continually kept in play by a girl about ten years of age, whose arms seemed too feeble for the wearisome task imposed upon her, and the liveliness which she evoked sadly contrasted with her melancholy heart-broken countenance.

One of the dogs, after the mockery of a lengthened waltz, seemed so tired that it could hardly support its body in the position which it *dared* not change, even for a momentary respite; and as soon as it had completed its forced part, and was lifted up for its brief rest upon the travelling stage which a little waggon afforded, it laid its head on its fore-feet; and seemed—I wish it had been a reality—to die.

So great was its fatigue, that it fell asleep instantly, amidst the din of the organ, the babble of the spectators, and the resounding crack of the whip, at which the monkeys in their turn were now to tremble.

Nothing unnatural ought to be pleasing, nor is it to a well-regulated mind, and if in forcing the powers and habits of brutes to do what is only for the sake of idle exhibition (when they were made subject to man for a useful and necessary purpose only) or to show a superior ingenuity in the art of torturing, results are produced which the Almighty has daily shown he did not design—but on the contrary, forbad—the moral baseness of those who so abuse their power and privileges is indeed great. If

> "Man's inhumanity to man
> Makes countless thousands mourn,"

his deliberate cruelty, his detestable tyranny to the brute creation makes millions wretched.

State of Crime in England.—If we consult the reports of Parliamentary Committees, or other publications, which appeared in former years, we shall see that society then found as much cause for complaint and grief through the prevalence of crime as we find at the present day; and, further, we cannot but be struck with the fact, that however prevalent offences may now be against property, we enjoy a far greater degree of protection from personal violence than our forefathers. In the early part of last century it was no uncommon thing for persons to be knocked down and robbed at noon-day in the public thoroughfares of London, while the roads in all directions were infested by robbers on foot and on horseback, who were ready for the commission of any number of murders, if met by resistance on the part of those whom they attacked. Even since the beginning of the present century, it happened to a physician, who, in the performance of his professional duty, was frequently obliged to cross Blackheath at all hours of the night, that for the preservation of his own life he at different times found himself under the necessity of shooting several highwaymen by whom his carriage was attacked. The highway robberies and even murders committed upon what was then Hounslow Heath were of such frequent occurrence that they seemed almost matters of course, and he was considered a bold man who would venture alone to cross that spot after nightfall. The author has been told by gentlemen now living, who were accustomed to repair after business hours to their residences in the environs of London, and particularly on the south side of the Thames, at Dulwich and Norwood, that it was the uniform practice to appoint some place of rendezvous from which they proceeded in a body for mutual protection. These things have passed away, and are become only matters of tradition. One cause of their diminution has been the greater use of paper money, and consequently the smaller amount of coin which travellers carry with them, by which means the risk of after-detection is greatly increased; but the chief means of suppression are found in our improved system of police, which, while it has succeeded to a great extent in putting down these graver outrages, has brought to light numerous minor delinquencies, and placed in our criminal records offences which previously passed unpunished, or were summarily dealt with by the populace. We might search those records of former periods in vain for the evidence of many offences which now swell the calendar—not that the offences were unknown, but that the punishment of them was not reserved for the magistrate. The pickpocket, for example, who should be detected in the commission of his offence, was dragged by the mob to the nearest pump, half drowned, and allowed to depart.—*Porter's Progress of the Nation.*

Shikarpur.—The haughty Moslem, mounted on his fine Khorassan steed, decorated with rich trappings, himself wearing the tall Sindhian cap of rich brocade, and a scarf of gold and silk, jostles through the crowd, between whom a way is opened by the Sindhian soldiers who precede and follow him; then follows the Affghan, with a dark blue scarf cast over his breast, his long black hair falling in masses on his shoulders, his olive cheek tinted by the mountain-breeze, and his eye full of fire and resolve. We have also the Seyud of Pishin in his goat's-hair cloak, the fair Herati, the merchant of Candahar, with flowing garments and many-coloured turban, the tall Patan with heavy sword, and mien calculated to court offence, while among the rest is the filthy Sindhian, and the small, miserable-looking, cringing Hindu, owning perhaps lacs in the neighbouring streets, but fearing the exactions of the Amirs. These present a fair sample of the groups who crowd the principal street of Shikarpur; but we miss the wild Biluchi with his plaited hair and ponderous turban, his sword, matchlock, and high-bred mare; but the freebooter of the desert loves not cities, and is rarely seen in them."—*Personal Observations on Sindh, &c., by Capt. T. Postans.*

A Kuzzauk Dinner.—The food was now brought in, upon a dozen wooden bowls or platters, and placed before us. It consisted of boiled mutton, soused in its own soup. Bread and vegetables are things quite unknown in these parts. Kuzzauks are exclusively carnivorous. The whole party fell on, like a pack of wolves: my own stomach, weakened by sight of the victim's face, was quite turned by the scene before me. Never did I see so much flesh devoured in so brief a space. Yet I have witnessed the feasts of tigers and wolves. The father and son would not partake until the guests had concluded, although I entreated them to do so. The women did not appear until chins had done wagging; but two of the senoras entered afterwards, to serve out curdled milk (mahss) in large bowls. The broth of the mutton also was brought in and distributed; being swigged as if it had been beer. The bowls were handed to the women, who scraped them clean with their thumbs, then plunged those members into their mouths, and again into the bowls, with a rapidity truly admirable. The thumb and tongue are the only napkins in Khauzism; water is never thrown away upon either bowl or person. The Tartars are right not to eat with their women. Imagine a pretty girl, with a sheep's head in both her lily hands, tearing off the scalp, picking out the eyes by the insertion of her fore-finger, cracking them between her teeth like gooseberries, thrusting the same pretty finger in after the brain, and sucking away at the apertures. All which I saw executed by one of the men in a most natural and edifying manner.—*Captain Abbot's Journey from Heraut to Khiva, &c.*

Boring for Hot Water.—An attempt is actually being made to obtain a supply of hot water by boring, for the purpose of heating the greenhouses and menageries in the Jardin des Plantes at Paris. It is an ascertained fact that the temperature increases as we descend into the bowels of the earth, according to the observations of Arago and others, at the rate of one degree for every 45 feet, after passing the first 60 or 70, which may be influenced by the external atmosphere. It is therefore intended to bore to the depth of nearly 3000 feet, where it is expected that water will be obtained of the temperature of about 100 degrees of Fahrenheit, and being conducted by pipes, will communicate a more equable supply of warmth than either air or steam flues, which will be maintained, after the original cost of procuring it, as long as the internal heat of the globe remains the same, without further expenditure.



[The Seiks.]

RISE AND PROGRESS OF THE SEIKS.

The history of the late Runjeet Sing, though not the most extraordinary, is the most recent, instance of one of those political revolutions, effected by the superiority of an individual mind, which have so often occurred in the East. Being recent, also, it is less known than others which have become familiar matters of common history. Of course many predisposing causes existed which a man of penetrating intellect could turn to account; but before such a man arose they were no more than the unprepared materials for a fabric, a confused mass of rubbish, though in part ready, it is true, for the hands of the architect and builder.

In the year 1469 there was born in a small village in the province of Lahore, a man called Nanac Shah, who, dissatisfied alike with the worn-out system of the Hindoos and the corruptions which had crept into Mohammedanism, sought to direct his countrymen to a faith less impure, embracing the essential doctrines which both Hindoo and Mohammedan held in common, for which purpose he visited the principal cities of India. One of his disciples, Angad, was initiated in his doctrines, and on Nanac Shah's death he became the leader of those who professed the new faith. The writings of both are contained in a book called 'Grunth.' Their followers were called Seiks, from a Sanscrit word signifying a disciple, and they soon became a numerous sect, distinguished by their dress and manners, and living apart in villages under the authority of one of their number. The tenth successor of Nanac Shah gave a new direction to the energies of the Seiks, and by the institution of a state council formed them into a federative commonwealth; while this first step in political existence was accompanied by attempts to arouse in the sect a desire for worldly power, and its members were required to devote themselves to arms. The Seiks now drew upon themselves the vengeance of the Mohammedan government, and such vigorous measures were adopted against them that for thirty years their existence was almost forgotten. From this insignificant state of existence they were enabled to emerge by the increasing weakness of the Mogul empire, especially on the invasion of India by Nadir Shah, and during these troubles the Seiks ravaged the greater part of the Punjab; when reverses in the field again drove them into obscurity, and they were everywhere exposed to a rigorous proscription. But they had been taught that robbery was a virtue, and their appetites had been whetted by plunder, so that though they might often be defeated, they were again ever on the alert as soon as the forces opposed to them had withdrawn. After many struggles with Ahmed Shah, who was not able to occupy the country permanently, the Seiks, about 1764, became the undisputed masters of the Punjab. Their political supremacy was naturally followed by a great increase of their numbers as a religious body.

At this point in their history we may gain some knowledge of the future rise of the Seik power by glancing at the nature of their constitution as a community. The Seik chiefs had been followed to the field by their relations and by volunteers, who were considered as associates and partners in each separate enterprise, and regarded the lands acquired as common property, in which each had a share according to the degree in which he had contributed to the success of the party. These associations were called 'Misuls,' of

which there were originally twelve, who could bring into the field about seventy thousand horse.* Over these 'Misuls' the 'Gooro Mata' or National Council should have exercised some degree of authority, but its functions were cramped by the turbulence, intrigues, and factious conduct of the independent chiefs. Theoretically the constitution of the state was that of a republic, but practically society was in so disunited a state that it was difficult to recognise a federal principle, especially after the Seiks had ceased to have an enemy in the field, for then the chiefs were less than ever restrained in their independent action. In 1783, Mr. Forster, an English traveller, quoted by Sir Alexander Burnes, predicted with great sagacity, that "should any future cause call forth the combined efforts of the Seiks to maintain the existence of empire and religion, we may see some ambitious chief, led on by his genius and success, display, from the ruins of their commonwealth, the standard of monarchy." It was soon after this was written that, through the activity, energy, and boldness of Maha Sing, one of the least important of the 'Misuls' began to rise superior to the rest. Many independent sirdars followed Maha Sing's standard for the sake of plunder, and were happy to live under the protection of so successful a leader. Maha Sing died in 1792, at the early age of twenty-seven. His son was destined to accomplish much greater changes. At his father's death Runjeet Sing was only twelve years old. His life had been devoted to field-sports; his education had been totally neglected, and he could neither read nor write: but, aided by the gifts which nature had bestowed, he established himself as the head of a monarchy more powerful than any which has existed in Hindostan in the present century. At the age of seventeen Runjeet Sing dismissed his 'deewan' or council, and assumed himself the management of his affairs. Between 1795 and 1798 the Punjab was several times invaded by Shah Temaun, but he was obliged to withdraw, and Runjeet Sing had the address to obtain from the invader a grant of the city of Lahore. Time and circumstances were now favourable to the great object of his ambition, and the quarrelsome and short-sighted 'sirdars,' or independent chieftains, whose jealousies of each other kept them disunited, and who in their quadrangular military-looking castles, surrounded by lofty walls and turrets, in vain raved against the slow but sure march of subjugation, were gradually compelled to submit to his supremacy, and to the arbitrary exactions which it was his pleasure to impose upon them.

In 1804 Runjeet Sing turned his attention to the dependencies of Afghanistan east of the Indus, and in consequence of the weakness of the Afghan monarchy he seized upon them, and the semi-independent chieftains of the country transferred their obedience from the court of Cabool to that of Lahore. He next carried on his aggressions both on the eastern and southern banks of the Sutledjh. His authority over the whole of the Punjab was soon so firmly established, that in 1808 the British government in India sent an envoy (Sir Charles T. Metcalfe, now governor-general of the Canadas) to negotiate a treaty of friendship with him. Runjeet was at first restive, and it was found necessary to march up a body of troops. Eventually he became convinced that the British government had no design upon his territories, and in 1809 the treaty was signed. From this time his confidence in the faith of the British never wavered, and it was in vain that many of his courtiers attempted to instil jealousies into his mind on this point. Any opposition from the 'misuls' was now out of the question, and in fact only three remained out of the twelve which originally existed, one of which had Runjeet himself for its head, and the others were completely under subjection. His court consisted of persons who were nearly all destitute of education, and one of them, who held an important office, had been cook to a private soldier. It was soon after the conclusion of the treaty with the British government that he began to adopt the European system of organizing and disciplining his troops. When his army was in its highest state of efficiency, it consisted of seventy-five thousand men, of whom twenty-five thousand regular troops received a higher pay than the British government pays to the sepoys in its service, and these were drilled on the European model. This branch of his military force included five thousand cavalry and artillery, with one hundred and fifty guns. The irregular troops consisted entirely of cavalry, fifty thousand in number, who were called 'Ghoorcas,' and for their military service received assignments of land. In 1818 Runjeet seized upon the province of Mooltan and the city of Peshawur, and in 1819 he annexed Cashmire to his territories. During the next ten years he still further extended his possessions. In 1831 Lord William Bentinck, the governor-general of India, had a conference with Runjeet Sing, which was marked by a more than ordinary display of oriental magnificence. In 1838 his relations with the British government became still closer, and he agreed to cooperate with the British forces in placing Shah Soojah on the throne of Cabool. He was afterwards received in great state by Lord Auckland, the governor-general of India; nothing could exceed the gorgeous magnificence displayed at this interview.

Runjeet Sing died in 1839, at the age of fifty-seven, prematurely enfeebled by excesses of various kinds. In person he was remarkably ugly, was deeply pitted with the small-pox, had a stoop in his shoulders, and had only one eye—but such an eye! it revealed at once the indomitable energy of the man's character and the superior intellectual vigour of his mind. Mr. Osborne, in enumerating the characteristics of this remarkable person, says:—"His courage was of that cool and calculating sort which courted no unnecessary danger, and shunned none which his purposes made it expedient to encounter; and he always observed a just proportion between his efforts and his objects. Gifted with an intuitive perception of character, and a comprehensive knowledge of human nature, it was by the over-ruling influence of a superior mind that he contrived gradually, almost insensibly, and with little resistance, not only to reduce the proud and high spirited chiefs of his nation to the condition of subjects, but to render them the devoted adherents of his person and the firm supporters of his throne. With an accurate and retentive memory, and with great fertility both of invention and resource, he was an excellent man of business, without being able to write or even to read. As insensible to remorse and pity as indisposed to cruelty and the shedding of blood, he cared neither for the happiness nor the lives of others, except as far as either might be concerned in the obstruction or advancement of his projects, from the steady pursuit of which no consideration ever diverted him. His success, and especially the consolidation of his power, are in a great measure attributable to the soundness of his views and the practicable nature of his plans. He never exhausted his strength in wild and hazardous enterprises, but restraining his ambition within the limits of a reasonable probability, they were not only so well-timed and skilfully arranged as generally to ensure success, but failure (in the rare instances when they did fail) never seriously shook his stability or impaired his resources." Men guilty of crimes were never punished with death, though they

* 'Origin and Rise of the Sikh State,' by the Hon. W. G. Osborne.

were frequently cruelly mutilated; but most generally they were banished to the hill-country. Runjeet Sing's policy, though so prosperous as regarded his own political interests, must not be compared for its beneficial effects with that of the governments of Europe: it may be regarded with some esteem only when contrasted with the wretched misgovernment of Eastern countries. The public revenue, amounting to about 2,500,000*l.*, was obtained by arbitrary exactions at the will of the collector. In the treasury there was property amounting to twelve millions sterling, but the pay of the regular troops was frequently eighteen months in arrear. The operations of the merchant and the trader were paralysed by exorbitant duties. The revenue was embezzled by the higher officers of state, whose general corruption in the East renders it almost impossible for the wisest ruler to carry out just principles of government; and although Runjeet Sing interfered in business of every kind, down to the most petty details, able and honest instruments were wanting, and many at least of the errors of his government are to be traced to this defect.

The Punjab, the country over which Runjeet Sing completely established his authority, is bounded on the north by the Himalaya Mountains, on the west by the Indus, and on the east and south by the Sutledjh and four other rivers. It forms a triangle, whose base, about four hundred and fifty miles in length, is at the foot of the Himalayas, and the two sides, on the east and west, are each about six hundred miles. In the hill-country, on the northern frontier, the power of the Seiks is not so great as in the plains, which comprise the chief part of the country. The cultivated tracts in the neighbourhood of the rivers are very productive, but there are extensive districts beyond the reach of irrigation, which serve only as pasture-grounds for cattle after the rains. The northern parts of the country are the best cultivated, as the rains are more frequent, and irrigation is facilitated by a number of small streams. Sufficient wheat is grown for the population, but rice is the great object of cultivation. The sugar-cane is cultivated, and a good deal of sugar is made. Among the fruits are oranges, lemons, figs, almonds, and apples. Melons constitute a large part of the food of the poorer class. The country abounds in horses, mules, and camels, though the camels are small. The Indus and all the rivers of the Punjab are navigable, but the commerce of the country is so insignificant that they can scarcely be said to be navigated at the present time. Except in the vicinity of the mountains on the north, the roads can be travelled by wheel-carriages over the whole country. Sir Alexander Burnes states that the Punjab, notwithstanding its general fertility, is a poorly-peopled country. According to his estimate the Seiks do not exceed five hundred thousand, and the Mohammedans and Hindoos amount to about two millions five hundred thousand. So well-established is the authority of the ruling minority, the Seiks, that the Mohammedans dare not venture to offer up their prayers in public. Runjeet himself was a believer in omens and dreams. He cared little for the national religion, but knowing that the 'Bedee,' or head of the Seik church, might, if so disposed, give him trouble, he always paid deference to the priests.

Lahore and Umritser are the two principal cities of the Punjab. The former is the seat of the court, and the latter, situated thirty miles eastward of Lahore, is not only the great emporium of commerce between India and Cabool, and the centre of commercial influence in the Punjab, but it is the holy city of the Seiks. Here there is a handsome temple of the national religion, covered with burnished gold, and standing in the centre of a lake. Sir Alexander Burnes visited it, and made an offering to the 'Grunth Sahib,' or holy book, which lay open before a priest, who fanned it with a tail of a Tibet cow to keep away impurity and add to its consequence. Lahore is 1356 miles (travelling distance) from Calcutta, 1070 from Bombay, and about 1000 from the sea, by the Indus, which is navigable the whole way: a boat may drop down in fifteen days. At Lahore is the Shahniar, or 'house of joy,' the garden of Shah Jehan, half a mile in length, consisting of three terraces raised one above the other, and refreshed by the sparkling waters of four hundred and fifty fountains. The barbaric pomp and gold which dazzled the eye in the court of the 'Lion of the Punjab,' was magnificent in the extreme. There might be seen glistening on the arm of Runjeet Sing the 'Koh-i-noor,' or 'Mountain of Light,' the largest diamond in the world, and which he obtained by force and address combined, from Shah Soojah, the deposed king of Cabool: it now adorns an idol in the temple of Orissa.

The Seiks know no other occupations than those of war and agriculture, and their taste is much stronger for arms than the cultivation of the soil. They are a robust and athletic race, of sinewy limbs, and tall stature. Sir Alexander Burnes, in the account of his visit to Lahore in 1832, remarks:—"There is a curious subject for speculation in the appearance of the Seik people and their general resemblance to each other. As a tribe they were unknown four hundred years ago; and the features of the whole nation are now as distinct from those of their neighbours as the Indians and the Chinese. With an extreme regularity of physiognomy, and an elongation of the countenance, they may be readily distinguished from the other tribes. That any nation possessing peculiar customs should have a common character is easily understood, but that, in such a short period of time, some hundred thousand people should exhibit as strong a national likeness as is to be seen among the children of Israel, is, to say the least of it, remarkable." The Seik ladies have sharp but regular features, and are not so good-looking as their husbands, in this point resembling the women of Naples. Confinement to the house is not so strictly observed by them as by the Mohammedan women. One of the peculiarities of their dress, mentioned by Sir Alexander Burnes, consists in knotting the hair at the crown of the head, over which a white robe is thrown which entirely envelops the body and gives a conical shape to the head. He states that they pull up the hair so tight to form the knot, that the skin of the forehead is drawn with it, and the eyebrows are considerably removed from the visual organ.

On the death of Runjeet Sing he was succeeded by his son Kurruck Sing, of whom Burnes, a few years previously, had spoken as an illiterate and imbecile person. The Seiks had probably as mean an opinion of him, for in a short time he was dethroned, and his son Noor Nihal Sing was elevated in his stead. Sheere Sing, an adopted son of Runjeet's, was the most popular person in the Punjab a few years before the 'old lion's' death, from his bravery as a soldier and the frankness of his manners.

Voracity of the Trout.—A curious circumstance once happened to me (John Crerar) at Pulney Loch; one of my sons threw a live mouse into it, when a large trout took it down immediately. The boy told me what had happened; so I took my fishing-rod, which was leaning against my house close to the loch, and put a fly on. At the very first throw I hooked a large trout, landed it, and laid it on the walk; in two seconds the mouse ran out of its mouth, and got into a hole in the wall before I could catch it.—*Scrope's Days of Salmon Fishing.*



THE RIVER DUDDON.—No. III.

[Continued from p. 270.]

Before leaving Seathwaite, the tourist should not fail to visit the station Wordsworth has pointed out in his 'Notes,' for the sake of the view he so beautifully describes. The reader who may not have his work at hand, will thank us for quoting the whole passage, hardly equalled, we think, by any descriptive piece in modern prose. He is speaking of the way of approach to the Duddon:—'After all, the traveller would be most gratified who should approach this beautiful stream neither at its source, as is done in the sonnets, nor from its termination, but from Coniston over Walna-scar, first descending into a little circular valley, a collateral compartment of the long winding vale through which flows the Duddon. This recess, towards the close of September, when the after-grass of the meadows is still of a fresh green, with the leaves of many of the trees faded, but perhaps none fallen, is truly enchanting. At a point elevated enough to show the various objects in the valley, and not so high as to diminish their importance, the stranger will instinctively halt. On the foreground, a little below the most favourable station, a rude foot-bridge is thrown over the bed of the noisy brook foaming by the wayside. Russet and craggy hills, of bold and varied outline, surround the level valley, which is besprinkled with grey rocks plumed with birch-trees. A few homesteads are interspersed, in some places peeping out from among the rocks like hermitages, whose site has been chosen for the benefit of sunshine, as well as shelter; in other instances, the dwelling-house, barn, and byre compose together a cruciform structure, which, with its embowering trees, and the ivy clothing part of the walls and roof like a fleece, call to mind the remains of an ancient abbey. Time, in most cases, and nature everywhere, have given a sanctity to the humble works of man that are scattered over this peaceful retirement. Hence a harmony of tone and colour, a consummation and perfection of beauty, which would have been marred had aim or purpose interfered with the course of convenience, utility, or necessity. This unvitiated region stands in no need of the veil of twilight to soften or disguise its features. As it glistens in the morning sunshine, it would fill the spectator's heart with gladsomeness. Looking from our chosen station, he would feel an impatience to rove among its pathways, to be greeted by the milkmaid, to wander from house to house, exchanging "good morrows" as he passed the open doors; but at evening, when the sun is set, and a pearly light gleams from the western quarter of the sky, with an answering light from the smooth surface of the meadows; when the trees are dusky, but each kind still distinguishable; when the cool air has condensed the blue smoke rising from the chimneys; when the dark mossy stones seem to sleep in the bed of the foaming brook; *then* he would be unwilling to move forward, not less from a reluctance to relinquish what he beholds, than from an apprehension of disturbing, by his approach, the quietness beneath him.'

This station will be found without difficulty by those who have descended from the source of the Duddon. You cross the vale from Seathwaite by Seathwaite brook, having Under-crag on your left, and, *ascending* Walna-scar, the proper position will be readily found by the preceding description, which is as accurate as it is beautiful. In returning we may follow the streamlet here spoken of, which dashes in a sparkling current past the churchyard of Seathwaite, till it joins the river in the midst of the wild and beautiful scenery which gave occasion to the sonnets from the fourteenth to the twentieth inclusive. This is unquestionably the grandest part of the scenery of the Duddon. The river here makes its way between steep and lofty crags of bold and varied aspect, and as the course of the stream is very tortuous, strange and striking combinations of forms, with wild and varied effects of light and shade, occur at every step. The rock is a friable kind and shattered in every direction; large masses have fallen from the heights on either hand,

and others impend in a threatening manner. "The *chaotic* aspect of the scene is well marked by the expression of a stranger, who strolled out while dinner was preparing, and at his return being asked what way he had been wandering, replied, 'As far as it is finished.'" (Wordsworth.)

The best way to explore the scenery here, if the traveller does not mind a little rough climbing, is to get into the bed of the river by the brook, and proceed along it under Walla barrow crag as far as he can towards the source. He must make his way over the huge fragments of rock that in some places appear to entirely block up the bed of the river, the water forcing itself under and between them in such a manner as to be unseen at a little distance; and in others are so disposed, as to produce the singular variety of sparkling waterbreaks that occur here in little more than half a mile. It is rather a rough way, and the visitor may perchance get wet feet; but if he confine himself to what he can see from the crags above, he will miss his only chance of seeing some scenery seldom to be matched for a grandeur nearly allied to sublimity. A great beauty in these mountain-streams is that a few yards will present you with an almost entire change of landscape; here it is remarkably the case: one moment bare rude rock towers up against the deep blue sky, the water dashes along in a shallow brawling stream, while the broken outline of a mountain pile bounds the distance; the next we are shut in by light and graceful trees, the varying hues of the birch ash and hazel blending in exquisite harmony, and imaging themselves in a still pool over whose surface a crowd of merry insects ceaselessly gambol, their gentle hum but adding to the deep feeling of quietude. Here, in this little space of some half a mile perhaps, might the painter find almost a month's employment in making *studies* of rock and foliage, mingling their various tints with the underwood and everchanging water. But we have lingered too long. Retracing our steps, we again proceed towards our journey's end. Though our river, after we have passed the Seathwaite brook, flows along a more level country, is unmarked by any of the grander or more striking features on which we have hitherto dwelt, the way is very beautiful. And the traveller may find "honeysuckle hedges" and "primrest banks" that would have made honest Izaak Walton's heart glad; nor will he want a "sweet shady arbour which Nature herself has woven with her own fine fingers; just such a contexture of woodbines, sweetbriar, and jessamine, and so interwoven, as will secure him from the sun's violent heat and an approaching shower."*

The next place of any consequence, after leaving Seathwaite, is Ulpha (pronounced Oopha by the Dalesmen). Before reaching it we come upon a singular assemblage of rocks that might have suggested the idea of Wordsworth's twelfth sonnet, though we believe it is intended to describe those by Seathwaite, of which we have already spoken. These are very singular: they project but little above the surface of the water, but are riven into the most fanciful forms, over, and through, and between which the river makes its way in a number of sparkling waterbreaks of varied sizes and height. We point the visitor's attention to this spot, not only for its singularity, but that he may also notice the rock itself. A fine red porphyritic dyke here crosses the channel of the river, contrasting finely with the light limestone with which it is in conjunction. It is, of course, owing to the greater hardness of this dyke that it projects so much above the level of the neighbouring rock, and that the irregular appearance here spoken of is produced.† The whole course of the river, from Seathwaite to Ulpha, is ex

* 'Complete Angler.'

† We may mention that, though we have not referred to the geological features of our route, there is much in it to interest the geologist; nor need the botanist fear that he will lack employment.



[Duddon Sands.]

ceedingly picturesque; the views are more open and extended than heretofore, and the distant mountains are of pleasing, often graceful forms, both alone and in combination: Broughton tower, too, as seen in many places, is a pleasing addition to the landscape. As we approach Ulpha, its chapel forms an interesting landmark. Wordsworth says:—

> "The kirk of Ulpha to the pilgrim's eye
> Is welcome as a star that doth present
> Its shining forehead through the peaceful rent
> Of a black cloud diffused through half the sky."
>
> *Sonnet XXXI.*

It is situated on a high bank, and commands a fine view. You may well wander awhile in the churchyard, "soothed by the unseen river's gentle roar, from pastoral graves extracting thoughts divine." Walker was offered the curacy of Ulpha, but declined holding it along with his own, lest it should be attributed to covetousness in him, his own living at that time (1755) being worth 15*l.* *per annum!* At Ulpha there is a public house (known as Ulpha Kirk-house), in which the traveller will meet with better accommodation than at Seathwaite, but the scenery is not so fine, nor does it divide the distance so well.

From Ulpha the river widens, but becomes tamer and less romantic; it will, indeed, hardly repay the trouble of following its windings, especially as the ground on each side is enclosed. It must, however, be joined again by Broughton or sooner, for—

> "*now* expands
> Majestic Duddon over smooth flat sands,
> Gliding in silence with unfettered sweep!
> Beneath an ampler sky a region wide
> Is opened round him: hamlets, towers, and towns,
> And blue-topped hills, behold him from afar."
>
> *Sonnet XXXII.*

Our great guide here likens him to—

> "Sovereign Thames,
> Spreading his bosom under Kentish downs;"

but, it must be confessed, it requires all fancy's help to sustain the resemblance. Still it is a noble sight, when the full-tide has laid the whole stretch of sand, a mile and a half across, under water, to gaze from some elevated spot over it as it mingles its waters with the mighty ocean, the setting sun meantime blending all into the glow of golden splendour, while thousands of waterfowl, darting in every direction with the swiftness almost of the lightning, and baffling the keenest eye to follow their rapid evolutions, impart an air of liveliness to a scene that might else perhaps be too sombre from its uniformity.

THE FREE MINERS OF DEAN FOREST.

One of the few English forests yet remaining in the possession of the crown, viz. Dean Forest in Gloucestershire, is, and long has been, the scene of very remarkable usages in respect to the possession and working of the mineral products beneath the soil. If we look at a map of the county, we shall see that there is an angular portion northward of the spot where the river Wye joins the Severn, and abutting upon the counties of Monmouth and Hereford. In this angular portion is situated the Forest of Dean, which has been the property of the crown from time immemorial. At intervals the laws and customs by which this forest is regulated have come under the notice of parliament, chiefly in relation to the respective rights of the crown on the one hand and those of the inhabitants on the other, and in 1838 an act was passed, by which three Commissioners, Mr. Sopwith, Mr. Buddle, and Mr. Probyn, were appointed to settle various disputes which had arisen, and to place the government of the forest on a better footing. The Commissioners had a laborious office to fill, and in November, 1841, published an elaborate exposition of their labours, relating principally to the management of the coal and iron mines of the districts.

The Forest of Dean comprises an irregular area of about thirty miles in circuit, covered for the most part with timber, and containing extensive seams of coal and iron. From time immemorial, all male persons born in the hundred of St. Briavel's, in which the Forest is situated, have enjoyed the right of working these mines, subject to the leave or licence of the *gaveller* or deputy-gaveller, and to the payment of an annual gallage, rent, or duty to the crown. The share of the crown has been reckoned at one-fifth of the produce; that is, after any four free-miners have sunk a shaft or pit, and have begun to work the mine, the crown may either put in a fifth man to share with them the produce, or may demand of them, as a composition, one fifth of the produce.

The Commissioners could not trace the origin of this custom, from its great antiquity. There seems to be evidence that the Britons and after them the Romans worked the iron-mines of the forest, but there is no evidence to show whether or not they worked the coal. At the time of the Norman conquest, the soil was in the possession of the crown, and all the rights of a Royal Forest were in force. The persons by whom the mines were then worked were probably in a state of servitude; and therefore the 'Free Miners' (a term which has been in use for many centuries) must have derived their rights from some subsequent privilege. It has been supposed that the privilege originated in some such way as this—that after a man had worked for a year and a day, or some other defined period, in the mines, he was awarded the privilege of digging on his own account, provided he gave a portion of the produce to the sovereign. The respective periods of a year and a day and of seven years, as connected with the means of becoming free by working and by apprenticeship, are well known in English law; and both periods are in operation for this purpose among the free miners, a year and a day being the time required for working in the case of a person born in the hundred of a free parent, and seven years for the apprenticeship of a son of a person not free.

The royal power seems sometimes to have been delegated; for in 1613 James I. granted the Forest with its mineral treasures to the Earl of Pembroke, for forty years; with liberty to work the mines, and a prohibition to other persons so to do unless with the earl's permission. There were, however, some reservations in favour of the miners who had previously inhabited the district. In Charles I.'s time there was a 'Mine-law Court,' which took cognizance of all matters relating to the forest, and of which the warden of the forest was chief judge. By the regulation of that court, a strong line of distinction was drawn between "free miners" and "foreigners;" none but "free miners" being allowed to work in the mines. The free miners appear to have taken their sons to work with them, and thereby, as also by the occasional taking of apprentices, their existence as a body was continued, with a recognition amongst themselves of each individual's right. Modern changes have in various ways led to the introduction of "foreigners" among the "free miners;" and this is the chief circumstance which rendered a revision of the whole system necessary.

The manner in which a free miner exercises his right is exceedingly remarkable. He claims the right to demand of the king's gaveller a *gale*, that is, a spot of ground chosen by himself for sinking a mine; and this, provided it does not interfere with the works of any other mine, the gaveller considers himself obliged

to give, receiving a fee of five shillings, and inserting the name of the free miner in the gale-book. The limit of interfering with other works was varied from time to time by order of the Mine Law Court; but of late years it has been thus:—that no gale can be granted within one thousand yards either in advance of the level or the land side of an existing work, or within a circle of twelve yards radius from a water-pit. The gaveller goes to the spot selected, accompanied by the free miner who makes the application, and gives him possession with the following ceremonies:—The gaveller cuts a stick, and asking the miner how many "verns," or partners, he has, cuts a notch for every partner, and one for the sovereign. A turf is then cut; and the stick being forked down by two other sticks, the turf is put over it, and the party galing the work is then considered to be put into full possession. The free miner, having thus obtained possession, is compelled to proceed with the work by working one day in the following year and day, and a day in each subsequent year and day (forfeiting the gale if he fails so to work), and to pay an annual sum of two guineas to the gaveller for each vein of coals he intends to work, till he gets at the coal, after which he agrees with the gaveller for the amount of composition to be paid to the sovereign in lieu of the fifth part. If the parties do not agree as to the amount of the composition, the sovereign has the right to put in a miner to every four free miners: but no instance has occurred for many years of this right having been acted on. The composition so fixed upon may be determined by either party on giving six months' notice.

The right to the gale is considered by the free miners to carry with it that of timber for the use of their works: this, however, seems to extend no further than to the use of the offal and soft wood, and the mode of obtaining it is for the miner to apply to the keeper of the 'walk' in which his mine is situated for an order, which he takes to the Swainmote Court, which, on receiving a fee of one shilling, gives him another order directed to the keeper of any walk in which there is timber fit for the purpose. These 'walks' are local divisions; the Forest of Dean being divided into Worcester Walk, Park End Walk, Blakeney Walk, Little Dean Walk, Speechhouse Walk, and Ruerdean Walk. The miner cuts the timber when assigned, formerly paying a small fee to the keeper of the Walk. There is no limit as to the quantity of timber, if it be strictly applied to the use of the works. The free miners claim a right to have land galed to them for opening mines, not only in the open lands of the forest, but also in all enclosed land, with certain exceptions: the only difference being, that in the case of gales in private ground the proprietor is let in as a partner, thus making a partnership of six, as the Company generally consists of four, and the king or sovereign also is considered a partner.

When the commissioners came to inquire how 'foreigners' had acquired so large an interest as they have in the Dean Forest mines, the evidence afforded them was very conflicting. Some witnesses alleged that none but free miners could, according to the ancient custom, hold a mine either by transfer, descent, devise, or in partnership; while others maintained that a mine, being originally galed to a free miner, might be sold, leased, devised, or pass by descent to a 'foreigner.' It appears from a 'Book of Laws and Customs,' printed in 1687, that the free miners might bequeath their doles or shares in the mines, on default of which the doles descended to their heirs; but it is not clear whether a foreigner, so taking or inter-writing, was entitled to work the mine himself, or was obliged to dispose of it to a free miner. There seems to be evidence that, provided a free miner's name appeared in the gale-book, the possession of the gale might actually lie with a 'foreigner.' When transfers and leases have taken place, free miners have been generally named as trustees; and it has been the general practice to let the free miner's name remain on the gale-book even after his interest in the gale has been transferred to a foreigner: the king's gaveller, however, receives the annual composition from the person in possession, crediting in the gale-book the amount so received to the free miner in whose name the work stands.

The 'foreigners' have entered upon these forest mining speculations to a very extensive degree, having, up to 1835, invested 700,000*l.* therein, of which 200,000*l.* were invested by one individual alone. It is plain that any disturbance of these vast arrangements would have done much commercial mischief: and hence the commissioners have had a delicate office to fill in assigning the relative privileges of the 'free miners' and the 'foreigners.' On the one hand, the free miners say that the working of the mines is secured to them by immemorial custom; while, on the other hand, the foreigners say that all their transactions have been open, unconcealed, and with the full sanction and privity of the crown, as represented by its officers; and they claim the protection of the law in the possession of that which the law has granted them. To reconcile these conflicting interests was the object of the appointment of the commission of 1838. The general system adopted has been a gradual transition from the antiquated and almost obsolete practices of past centuries to the more efficient modes of working at present adopted everywhere else, with such protection to existing rights, both of the free miners and of the foreigners, as could best be awarded.

The attention of the government having been thus strongly drawn towards Dean Forest, other arrangements have been set on foot for improving the social condition of the miners by founding churches, schools, &c.

MUSEUM OF ECONOMIC GEOLOGY.

THE mineral wealth of Great Britain, forming so important an element of her national greatness, it is a matter of surprise that efforts had not been earlier made for imparting general scientific information in mineralogy and geology to all who might choose to make them their study. Till a very recent period this knowledge was confined to a very few individuals, and the money that has been expended wastefully through an ignorance of even the first principles of geology must have been enormous. At the suggestion of Sir H. De la Beche, the government, in 1837, provided apartments, and, in 1839, appointed Mr. R. Phillips, a distinguished chemist, as curator, for receiving and managing a museum devoted to this purpose, and to the keeping of mining records. This museum is open to the public gratuitously throughout the year, from ten to four in winter (Nov. to Feb.) and five in summer; and Mr. T. Sopwith, of Newcastle-upon-Tyne, who had been very zealous in forwarding its establishment, has just published a very interesting account of its contents. This little book is not a mere catalogue, but a well-written description of all the principal objects; and we give a couple of extracts illustrative of the work, as well as the nature of the collection.

"A curious work of art has been recently added to the Economic Museum, which proves that the ancients had no superiority over the moderns in their power of working hard and durable materials. It is an antique bust, copied from one of the Egyptian antiquities in the British Museum (No. 52, a bust broken from a seated statue of Bubastes). The material of which this

copy has been made, by Mr. C. H. Smith, is a large-grained greenstone (formed of hornblende and felspar) from Llanwnda, near Fishguard, Pembrokeshire, and perfectly agrees in mineral composition and general aspect with the large-grained greenstones out of which the Egyptians cut so many statues, which yet endure, and promise to remain for ages to come, a testimony of their judicious selection of durable materials. Having no quartz in its composition, it is easier to cut than ordinary granite. Mr. Smith has obligingly favoured me with several particulars of the execution of the workmanship, which I here introduce not only for the novelty of the subject, but also as affording an example of the detailed information which it is desirable should accompany and be attached to each work of art in this museum. Steel tools, tempered to a dark straw-colour, were used, with an iron hammer*; the cutting edge was sharpened rather obtusely, so as to produce a succession of moderate batterings, rather than to attempt cutting or getting off large pieces by violent blows. When brought to a general form, the bruised surface was rubbed with coarse emery and pieces of sheet-lead, or bits of wood made to fit the various undulations. Finer emery with snake (or water-of-Ayr) stone was then used, and ultimately putty-powder gave as good a polish as the material was capable of receiving. The indentations were afterwards cut with a chisel and hammer. The time occupied in the operation was seventy-six days, and the cost of sculpture twenty-five pounds, exclusive of the trifling value of the stone."

"*Model of Dolcoath Mine*, by Mr. T. B. Jordan, Keeper of Mining Records.—This model occupies a recess at the east end of the Upper Gallery or Model-room. It affords a perfect view of the general arrangements of an extensive tin and copper mine, and was constructed by Mr. Jordan, when residing at Falmouth, in 1839. It measures in length five feet nine inches, and is two feet five inches high; each inch represents eight fathoms, or forty-eight feet; and as a scale of comparison it may be observed that the Monument of London is about two hundred feet high, and therefore would be represented by a small cylinder four inches long; the depth of this mine is therefore more than seven times the height of the Monument, and the descent to this vast depth is almost universally effected by means of ladders, some of which are shown in the model. Those parts of the model which are formed of mahogany represent the *granite* which, in some parts, forms the walls, sides, or *cheeks* of the lode or mineral vein, the remaining portion being *killas*, or clay-slate, represented by white wood (plane-tree or sycamore). As these descriptions are intended to convey information to those who are not conversant with mining details, as well as those who are, it may be useful to observe, that *lodes*, or mineral veins, are analogous to nearly vertical cracks or fissures, and thus widely differ from coal mines, where the *seam*, or bed of coal, lies nearly horizontal, or inclined at an angle which seldom exceeds ten or fifteen degrees; whereas mineral veins, *i. e.* containing tin, copper, lead, &c., rarely exceed that amount of divergence from a perpendicular, subject, however, to various undulations, as a glance at this model will at once show. The contents of the crack or fissure called the LODE (which, in this instance, is the main or principal lode, there being many such lodes running in nearly parallel directions, as shown by the plan of the mine) are represented by ebony or black wood, varying so as to represent a thickness from 2 to 6 feet. Considerable portions of this lode are seen to have been excavated, partly by regular shafts and drifts, and partly by extensive workings of irregular shape, depending on the productiveness of the lode. Some of these excavations are filled up again, whilst others are left open, as shown in the model. It will therefore be understood that the granite and clay-slate rocks are entirely removed from the side next the spectator; a view of the lode and the workings is thus obtained, and the unfilled excavations afford a view of the solid rocks on the further side of the lode, where the observer may trace the junction and intermixture of these rocks, the granite being as it were in some places injected into the substance of the killas.

"On the surface, beginning at the left-hand side of the model, are *deads*, or heaps of refuse, brought out of the mine. In a small valley are *dressing-floors*, with *stamps* worked by a large water-wheel. In front is a steam-engine working a *whim*, a rope from which communicates with and draws the ore, &c. from a shaft in a lode which runs at a short distance nearly parallel to that represented by the model. Two small houses on the right of this valley are called *burning-houses*, where the ores of copper and tin are roasted, and afterwards separated on the adjoining floors, as shown by the different heaps.

"A series of five water-wheels works sets of stamps contained in adjoining sheds. The stream of water for these wheels is partly pumped from the mine and partly derived from other sources. The small round heaps represent copper-ore ready for the market.

In the centre of the model is the pumping-engine by which the mine is drained; the water is pumped up to within ten fathoms of the surface, and escapes by the *adit* or *adit-level* nearest the surface. In front are the coal-yard and smithery. Behind, and on the right of the engine, are sheds where women are employed to break the ore, and an adjoining reservoir contains water for dressing the ores. The railroads, shown by double lines, are in some places carried under the buildings in tunnels, and in others pass over a framework where the ores are deposited: at the end of which is a *crushing-machine* worked by water. At the extreme right of the model the railway from Hayle to Tresavean passes obliquely across a corner of the model.

"Three steam-engines are employed to draw ores from three shafts in the main lode, as shown on the model. It would require a volume to describe fully the several processes carried on in the buildings and other places thus briefly enumerated; but the general idea of them afforded by the model is in miniature what a stranger would observe on a view of the establishment, with this advantage, that while the model gives a bird's-eye view of the general arrangement, other models, yet to be described, may be seen in the gallery, by which the exact nature of the stamping and dressing ores, &c. may be readily understood. As regards the interior, also, the eye at once comprehends the entire workings of the main *lode*; and the mind thus acquires a conception of all the arrangements, which could not be obtained by visiting in succession a few of the principal galleries or workings of the mine. The construction of the pumps and the method of raising the ores are explained by large separate models; and every variety of the ores, their mode of occurrence, and specimens of the associated rocks, are contained in the Museum of Economic Geology. The length of the *lode* represented is 3312 feet (not quite two-thirds of a mile, or 3520 feet); the depth of the main shaft is nearly 240 fathoms (1440 feet). In 1815 the copper-ores obtained at this time produced 66,839*l.*, the greatest amount in that year of any mine in Cornwall: and in a valuable statistical account by Sir Charles Lemon, of the number of persons employed in the Cornish mines in 1836 and 1837, it appears that 300 men, 220 women, and 70 children, making a total of 590 persons, were employed at this mine."



[Tunbridge Castle.]

RAMBLES FROM RAILWAYS.

PENSHURST TO TUNBRIDGE.

Though the road between these two places presents little of interest either to the antiquarian or the more general observer, as regards the solitary village or the not very numerous mansions that we pass or obtain a glimpse of by the way, the walk is delightful from the variety and beauty of the scenery. As we ascend the first hill encountered after leaving Penshurst—where some exceedingly pretty almshouses have been erected in the Tudor style (partly at the expense of the parish, and partly at that of Sir John Sydney)—and turn back, we have a charming view of the castle and church of the Sidneys, embowered but not hidden in the woods. A turn of the road presently shuts out that view: we ascend a little higher, and in a meadow on the left, a circle of trees, with a low hedge, apparently running round its base, attracts the eye, and in answer to our question, a passing countryman tells us that that is Gamage's Bower, words that in this neighbourhood seem to be as mystical and important as Sir Philip Sidney's oak and Saccharissa's grove, why, we cannot discover. "Barbara Gamage, Countess of Leicester," of whom there are two portraits at Penshurst, one by M. Garrard, representing her with six of her children, dated 1596, appears to be the lady referred to. Presently fresh changes take place: the thick hedges, sometimes swelling into dense plantations, open now on the right to reveal extensive prospects, then suddenly close again; a little farther on, and a similar process takes place on the left, whilst, at intervals, green lanes dive down suddenly from the road, looking so tempting and full of promise, that one can hardly resist the impulse of accompanying them into the depths of the beautiful valleys on either side to which they lead. The character of these plantations is, to a stranger's eye, remarkable—they are so full of young, very tall, and very slender shoots, which, continuing at intervals in masses for miles together, suggests the idea of their being grown for some peculiar purpose. What that is, an opportunity soon occurs of our determining, as we pass a field densely covered with these poles and the beautiful twining foliage of the plant they support, the hop, which now forms so important an item in the agricultural prosperity of Kent, but which, in 1528, or four years after its introduction, was petitioned against to parliament as a "wicked weed." A large group of old withered-looking trees, spreading their leafless lower branches in the most fantastic directions through the dense shade formed by their heads on the right, would form a fine study for the pictorial artist, and a striking contrast to the open, airy, sunny landscape which breaks upon us soon after at the junction of the two roads from Tunbridge. In the middle distance a green hill comes regularly sloping down from the right towards the centre of the picture: its outline finely relieved at first against the horizon, then against the distant hills, which, as it leaves entirely open the view towards the left of the picture, presents us with the delightfully situated villages of Mereworth, the seat of Lord le Despencer, and East Peckham, with its white church-spire, where the famous knights of St. John of Jerusalem once had a preceptory, or residence for a few members of the Order. We must pause once more as we reach the summit of the hill just mentioned, where we have the valley below us with its patches of golden heath, and white cottages gleaming here and there, extending far away, both right and left, a range of hills as high as that on which we stand opposite, whilst midway, hovering over the valley, a flight of rooks moves slowly and drowsily along, silent as everything else around them. Even the railway train that now comes into sight on the extreme left, seems to have lost its usually turbulent characteristics of progress, as it passes through this sweet valley, and glides, to our ear at least as we stand upon this eminence, smoothly and noiselessly along, till it is lost, in

a few minutes, in the picturesque mass of houses reposing toward the extreme right of the valley, and which we subsequently find is the place of our own destination, Tunbridge.

This is one of the places seldom visited expressly for its attractions, and yet, when visited, exceedingly interesting. Its youthful sister, a few miles off, Tunbridge Wells, has effectually eclipsed it, though but a mere upstart of a couple of centuries or so, whilst Tunbridge, when it would refer to its genealogy, must go back to the Conqueror certainly, and there is no saying how much further still. Tunbridge is a clean-looking, wide-streeted, and not altogether unpicturesque-looking place, were it only for its situation, on the Medway, here divided into several arms, and its numerous bridges; but it is not to these features we refer, nor to its large and handsome, but certainly not altogether architecturally homogeneous church (being of different styles), nor its richly endowed free-school, town-hall, or market-house, nor even to its priory ruins, now turned into a barn, but of its once famous castle, under protection of which the town first rose into wealth and repute, and which, from the extent of its remains and the existing records of its history, will well repay the attention of visitors. The remains are allowed to be shown by the proprietor, whose residence adjoins, four days in the week, namely, Tuesday to Friday. The castle was, of course, situated close to the river, so as to command its approach; near one of the bridges, and not far from the market-place, accordingly we find it. As we approach, we perceive that what is left of the castle comprises an entrance gateway, flanked by strong round towers, the whole tolerably perfect, and a high mound of earth, on which stood the keep or stronghold, and within which mound many apartments still exist. We ascend to the top of the latter by means of a winding path. Traces of the moat and walls, which enclosed in all about six acres, are also discoverable. Not content with the acknowledged antiquity of the castle, which was built by Richard FitzGilbert or Richard of Tunbridge, afterwards Earl of Clare, during the reign of the Conqueror, some of the very zealous local antiquarians will be content with no less than a Roman origin, pointing to a portion of the remains built with tile as a proof. The manor, it appears, was first given by the Conqueror to the church as a part of the see of Canterbury; but Odo, bishop of Bayeux, his half-brother, taking a fancy to it, seized and kept possession, in defiance of all remonstrances, till Lanfranc was appointed to the archbishopric, who speedily set to work in earnest to restore to the church all her past possessions in their integrity. Having complained to William, the latter, knowing by experience the avaricious character of his brother, did not hesitate to grant a formal and public trial, which took place, under circumstances of great solemnity, at Aylesford, in this county, before commissioners of distinction and a jury of the most respectable persons from the different counties where Odo had been exhibiting his rapacity at the expense of the see, in the same manner as at Tunbridge and other parts of Kent. Lanfranc's spirit and eloquence—for he pleaded his own cause—gave him a complete victory: twenty-three manors were restored to the church, Tunbridge forming the only exception; for as this had been given by Odo to his kinsman Richard de Clare, Lanfranc, at the intercession of the king, agreed to receive, in lieu of it, the castle and country of Brionne in Normandy, which belonged to that young nobleman. An interesting evidence of the simplicity of the times has been preserved in connection with this exchange. The castle of Brionne was measured by a string carried round it, which was brought over to England, and used to mark out an equal space of ground at Tunbridge, including the town, and this was the space given to the earl. Thus settled in his English possessions, the latter began the erection of his castle, which he made as strong as the skill and appliances of the time would admit. And many a stout struggle was to test that strength in subsequent periods. Richard himself was on the point of abiding a siege after the death of the Conqueror, through his espousal of the interests of Robert, instead of those of Rufus; but when the latter appeared before the castle with a large army, he submitted, swore fealty and observed his oath faithfully after. The life of the founder of the castle was in many respects a troubled one. Following Rufus to Normandy, in 1093, he was taken prisoner by the forces of the man whom he had before supported, Robert, and kept in confinement till the peace between the two brothers, in 1096, when Rufus obtained, for a sum of money, advanced for the purposes of a crusade, the dukedom of Normandy, in addition to the undisturbed and unquestioned possession of the kingdom of England. De Clare was then liberated, and returned to his home, where, after some years of peace, he went out to fight the Welsh during the reign of Stephen, and fell—an old man—at the battle of Abergavenny.

During his captivity his son Gilbert appears to have been in possession of the castle, and to have engaged in schemes that, but for a change of thought or feeling on his part at a critical moment, might have materially affected the succession to the throne if successful, or his father's power over his own possessions if they failed. A great conspiracy was formed against Rufus by the northern barons, under the management of Mowbray, earl of Northumberland, in which Gilbert joined. On the breaking out of hostilities, Rufus, marching against the insurgents, took Newcastle, after a two months' siege; and was pushing forward to Bamborough Castle to attack Mowbray, when a communication reached him that was in all probability the means of saving him his crown, if not his life also. Mowbray had placed with great secrecy a body of troops in a defile through which the king was to pass, and where defence from an unexpected attack was almost impossible. Gilbert, touched, it is said, by the remembrance of former favours, found means to inform Rufus of his danger, which was thus avoided. In the following reign, however, we find him again in arms against his sovereign, and defending his castle here, though unsuccessfully, against the forces of Henry I. On account of his father's services and his consanguinity, the king did not, as might have been expected, permanently deprive him of his possessions; which, after his death, descended to his son Richard, the first earl of Hereford, who founded the priory adjoining: the famous Strongbow, who so greatly aided in the conquest of Ireland in the reign of Henry II., was a nephew of this nobleman. During the civil wars of the reign of John, Gilbert, a lineal descendant of the man we have mentioned, and first earl of Gloucester of this family, was the possessor of Tunbridge Castle; which, in consequence of his devotion to the patriot cause, had then to endure another siege at the hands of Fowkes de Brent, the "Falco without bowels," a mercenary follower of John's, whom the people of England had especial reason to dread, and who succeeded in taking possession of it. The earl himself was subsequently taken prisoner at the battle of Lincoln by his father-in-law, the earl of Pembroke, but released on the general settlement of the affairs of the kingdom, which then took place through the entire defeat of the French prince whom the barons had called in to their assistance.

In the incidents thus slightly referred to, including little more than a century of time, we see the chequered kind of life led by the owners of these old

feudal castles—now attacking—now being attacked; one day absolute masters of the lives and fortunes of all within their reach, the next themselves the most helpless of the dependents of their enemies. Of peace, except as a mere necessity for the development of fresh strength to carry on war, they evidently had no idea: if the sovereign did not give them good reasons for fighting—a case of most unfrequent occurrence in the early period of our history—they were content with bad ones; or, if they could do nothing else, they could, as a last resource, fight with each other. Such being the general tenor of the history of our old castles, and especially of the more famous ones, where strength of fortification and importance of local position were added to high rank and great personal influence on the part of the owner, as at Tunbridge, it were an almost endless task to trace that history step by step downwards; we shall therefore merely refer to one or two other interesting matters connected with it during the war between Henry III. and the barons under De Montfort, when the castle was besieged and taken by Prince (afterwards King) Edward, the garrison having previously burnt the town. Gilbert the Red was then the possessor, the nobleman who, without qualities of any remarkable kind, exercised a powerful influence on a remarkable period. This is the Earl of Gloucester, who held so conspicuous a position among the barons headed by De Montfort: and who, at the battle of Lewes, when the king and the prince were taken prisoners, himself added a third to their number, the King of the Romans; but who subsequently, influenced either by suspicions of the integrity of De Montfort, or, what is much more probable, by a miserable jealousy of his power and popularity, reconciled himself to the king, and procured the escape of the prince, who soon after met De Montfort in arms at Evesham, and utterly destroyed him and all the leading men of what may be called the national party of the time. In consequence of these services Gloucester and Edward became greatly attached: the latter, on his return from the Holy Land to take possession of the throne, was entertained with all his retinue most nobly for some days at the castle; and not long after he gave his consent to the earl's marriage with his own daughter, Joan of Acre, as she was called; Tunbridge and all the earl's estates being, however, at the same time settled upon her and her offspring. The lady's history does not end here: Gilbert died in 1295, and some time after his widow formed a romantic attachment to a plain country gentleman, without rank or influence, called Ralph de Monthermer, or Mortimer, married him, and sent him up to Edward to declare the marriage and receive the honour of knighthood. Though Edward might have discovered something of his own spirit in this, he was so highly indignant at the affair, that he threw the husband into prison and took away all the wife's estates. The conclusion exhibits the iron-hearted warrior and most unscrupulous sovereign in an agreeable light. The bishop of Durham interceded for the princess, and succeeded in obtaining Edward's consent to see her, when forgiveness was soon granted: the rest was easy; her husband was freed; she was permitted to live with him. At last the king admitted him to his presence, when, it is said, he became so much attached to him, as to love him as his own son. Edward summoned him to parliament after the reconciliation by the title of Earl of Gloucester and Hertford, during the minority of the deceased earl's son, and subsequently by the title of Lord Monthermer. From this marriage the Duke of Manchester and the Earls of Sandwich, Halifax, and other noblemen have their origin.

The estate came into the possession of the crown on the attainder of the Duke of Buckingham, "poor Edward Bohun," during the reign of Henry VIII.: and having been subsequently given by Elizabeth to Lord Hunsdon, her kinsman, it ultimately passed into private hands, and was allowed to sink gradually into its present state of ruin.

WIRE-ROPES.

The use of iron-wire as a material for ropes is not one of the least remarkable applications of mechanical science which recent years have produced. The use of iron in bars has been known from early ages; but the combination of small wires, twisted and interlaced among each other, is quite a novel method. In the Supplement for November last the general construction of ropes, so far as the use of hempen-fibres is concerned, was treated on: and it may not be uninteresting to add a few details here concerning wire-ropes.

At the Newcastle Meeting of the British Association, Count Augustus Breunner made a communication on the use of wire-ropes in the Harz mines of Germany. About seven years before that period, ropes made of twisted iron-wire had been introduced in place of the flat hempen-ropes previously employed. Subsequently they have been adopted throughout the mines of Hungary and most of those in the Austrian dominions, to the almost total exclusion of hempen-ropes. These iron-ropes were described as being of equal strength with a hempen-rope of four times the weight. One had been in use upwards of two years without any sensible wear, whereas a flat hempen-rope performing similar work would not have lasted much more than a single year. The diameter of the largest wire-rope in ordinary use in the deepest Austrian mines is one inch and a half. The rope is composed of iron-wires, each two lines ($\frac{1}{6}$ of an inch) in diameter: five of these are braided together into strands, and three of these are twisted tightly into a rope. The strength of these ropes is little less than that of a solid iron-bar of the same diameter. The rope on leaving the shaft requires to be received on a cylinder not less than eight feet in diameter, and is kept well coated with tar. In one instance adduced, there is a saving of about one-third of the former power; for four horses with the wire-rope are doing the same work as six horses with a flat rope.

Wire-rope has been used lately as a means of drawing railway carriages, when a fixed instead of a locomotive engine is employed. Those who may have travelled along the Blackwall Railway will have had an opportunity of witnessing the use of wire-rope in this way; iron-wire having been introduced a year or two ago, instead of the hempen-ropes formerly used. A wire-rope was sent from England to Belgium, last year, for the use of one of the Belgian railways, measuring five thousand three hundred yards, and weighing twelve tons.

As a material for suspension-bridges, iron-wire has been found to constitute a most valuable acquisition. In the year 1834 was completed, by M. Challey of Lyon, a wire suspension-bridge over the river Sarine, at Freyburg in Switzerland, of which we have given a detailed account, with engravings, in Nos. 279 and 280.

A remarkable application of wire-rope is in the formation of rigging for ships. Readers of the public journals may have frequently seen announcements relating to this matter within the last year or two. Captain Basil Hall, in his additions to Professor Robison's article 'Seamanship,' in the new edition of the 'Encyclopædia Britannica,' after speaking of the use of iron-chains for cables, slings, top-sail sheets, bobstays, and other parts of a ship's fittings, observes:—"Attempts are now making, and we feel convinced that they will ere long succeed, to introduce iron-*wire*

rigging, which we consider as stronger and better than chain, 'because less dependent on the accidental quality and careless manufacture of a single part." Further on he remarks: "We do not think wire will answer for running-rope; but for standing-rigging it may, we conceive, be most usefully substituted for hemp." In the evidence given in connection with a trial at Liverpool last year, it was stated that the Great Liverpool, a steam-ship of 1400 tons burden, had been fitted up with wire standing-rigging; as had likewise several other vessels. Mr. Shaw, marine manager to the Oriental and the City of Dublin Steam-Packet Companies, has introduced wire-rigging into the vessels of the Companies; and he states the good qualities of this invention to consist in lightness, security, strength, and small resistance to the wind. Captain Bevis, government superintendent of mails at Liverpool, has stated that upwards of twenty government vessels have been fitted up with the wire-rigging, and the Great Britain, the enormous steam-vessel, at the launch of which Prince Albert lately attended, has all her standing-rigging of wire. Respecting the application of wire to this purpose, the following curious calculations have been made:—"The weight of standing-rigging now fitted and afloat in the Navy is about 7000 tons; and taking the price of hempen-rope at 46*l*. per ton, the value of a first outfit for the whole of the navy will be 322,000*l*.; upon which, by using the wire-rope for the same purpose, a saving would be effected of 107,333*l*., without taking into consideration the more than triple time that wire-rope will last. It may also be observed, that the wire-rope only exposes two-fifths of the surface to the wind, thus rendering ships rigged with wire to those of hemp less leewardly. It appears that 2303 lbs. of hempen-ropes thus applied expose a surface of 126¼ square feet to the wind; whereas the wire-rope, possessing strength as 80½ wire is to 63½ hemp, exposes only 51¼ square feet: and as the whole surface of hempen standing-rigging now fitted in the navy exposes (according to the above calculation) 860,000 square feet, whereas the wire-rope has only one of 344,000 square feet—leaving a difference in favour of wire-rope of 529,112 square feet; and allowing the mean force of the wind to be 1¼ lb. upon the square foot; the power saved on a leeway would be equal to about 4000 horse-power, or equal to the canvas of more than the whole of the sails of twenty-four frigates; and the displacement saved would be about 3500 tons, which would be equal to about 700 horse-power—making a saving in all of 4700 horse-power." Many of these calculations obviously require the test of long experience to determine their validity. It is also worthy of remark that the recent researches of Mr. Snow Harris concerning lightning storms has rendered it a point of serious importance how far the use of metal in the rigging of a ship may affect its safety during a storm.

The late Mr. Telford made many experiments to determine the strength of iron-wire, as shown in the power of resisting fracture. He set up two vertical posts, to one of which he attached one end of the piece of wire to be experimented on, and allowed the wire to pass over the other, then over an inclined post, and, lastly, to terminate in a weight. Besides the weight at one end, four other weights were attached to the wire; one midway between the two vertical posts, and one equidistant on either side of the centre. In one experiment the specimen of wire was $\frac{1}{10}$ths of an inch diameter, the props or posts were one hundred feet apart; and the wire required a weight of more than 530 lbs. before it broke. In another experiment the wire was $\frac{1}{10}$th of an inch diameter, the props were one hundred feet apart, and the wire broke with 738 lbs. weight. Many similar experiments were made, having for their object the determination of the strength of iron-wire under a variety of different circumstances.

In some of the recent inventions respecting the manufacture of wire-rope, the wires are formed into a twisted group before being applied to practical purposes; whereas in others the wires are laid parallel and bound together without twisting. In Mr. Smith's patent, of 1835, a description is given of the mode of constructing the shrouds and stays of a ship with wires. Pieces of wire, all of equal length, are taken, grouped together, and heated at one end in a furnace to a white or welding heat. This heated end is then passed through an opening connected with some of the mechanism of a ship, and beaten up so as to rivet the wires firmly in their place. This plan, and a plan of riveting to various pieces of iron and wood-work, constitute the modes of constructing the rope, the wires not being actually formed into a rope-like group until they are actually attached to the mechanism which keeps them together. In order to preserve the wires from corrosion or oxidation, they are coated or varnished with a solution of caoutchouc, oil, and asphaltum, or some other anti-corrosive composition; and the whole rope or combination of wires required for one shroud or stay is bound round with cloth or cordage previously saturated with the solution. In a patent taken out in the following year, Mr. Smith extends the principle to other objects. He proposes by this patent to group iron wires together, and to combine and secure them by interweaving hempen yarn among them, or by binding them with string or hempen yarn, or by joining them side by side in the manner of flat ropes, or by coating them with strong canvas, and sewing these casings of canvas together. One form of proceeding is thus described. A proper number of lengths of wire are laid parallel, and coated with an anti-corrosive caoutchouc solution. The wires are then slightly twisted into a strand, so as just to hold together, and to squeeze out the superfluous solution. These strands are then combined into a rope by any one of the methods above alluded to; the hempen or woven material introduced being in all cases previously saturated with the preservative solution.

In Mr. Newall's patent, of 1841, the wire-rope is formed by 'laying' or twisting wires round a central core to form a strand, and by twisting strands round a core to form a rope. The core may be of wire, hemp-cord, spun yarn, a filament of cotton, or a strip of leather. The combination of the wires into a strand is effected by rather a complicated assemblage of machinery, in some degree combining the character of the machines for making hempen ropes and of those used in spinning cotton.

In the same year Mr. Heimann took out a patent for wire-ropes composed of six strands laid round a core, each strand being composed of six wires laid round a core; the cores being saturated with a preservative solution before the wires are twisted round them. This, like the former method, is effected by rather complex mechanism. Other contrivances have been brought forward in different quarters; and the system generally has become so far valuable as to lead to inquiries as to the validity of some of the patents, their priority over others, and so forth: a pretty sure test at all times that the invention itself is deemed a valuable one.

Not only has wire been applied, instead of chains, for suspension-bridges, instead of large ropes for mines and inclined planes, and instead of cordage for ships' rigging, but also as a substitute for small string or large thread in the comparatively humble process of sewing boots and shoes. A few years ago M. Sellier, of Paris, secured a patent in France for the right of using brass wire for attaching the upper leather to the welt of boots and shoes. He states that this metallic

thread allows neither moisture nor dust to enter the boot or shoe; and furthermore that it does not 'rip.' The sewing is said to be performed with as much ease as with waxed thread, and as cheaply. As in most similar cases, the inventor is provided with examples to show how long boots and shoes have been known to last when made by this method; but we do not know to what extent the method has been tested, nor whether any English workmen have adopted it.

LOCOMOTION OF ANIMALS.—No. III.

It has been seen that every attitude of any one part of a man in standing, or in bearing a load, requires simultaneous alterations in the posture of the rest of the body; and we now proceed to show that the act of standing erect is dependent on the general structure and figure of the human fabric. The erect attitude, which contributes, amongst many other things, to distinguish man from the lower animals, is chiefly owing to his organization, and not the effect of mere mental development. It is found that animals instinctively adopt that position of the body which enables them to bear their own weight with the least expenditure of muscular labour, and that in all other positions the support of the body becomes irksome: let us now turn our attention to what takes place in the erect posture in man. The position in which the muscular force is least expended is that in which the bones of the skeleton, and all other parts, are poised upon each other at the joints about which they move: the muscles in this case have merely to perform the office of keeping the superincumbent parts exactly balanced. When a man stands erect, with the eyes directed horizontally forwards, or slightly inclined upwards, the centre of gravity of the head lies vertically over the centre of the joint that connects the head with the neck. also, the weight of the body and head is equally supported on the hip-joints; these again, with the thighs, rest on the centres of the knee-joints, and these on the elastic arches formed by the bones of the foot which are placed on the ground. Thus, in *Fig.* 1 it will be seen that the vertical line *x*, *y*, passes through all the points just enumerated; and, whilst the body is erect, there is required only sufficient muscular power to keep it balanced on the joints, and the joints from bending. Now, to show that the several parts are most easily supported in the erect position, let us see what happens when the body is horizontal. Take the head, for example. The centre of gravity of the head G (*Fig.* 2), instead of lying vertically above the joint of the neck *g*, as when erect, is distant from it by the length of the line G *g*, so that the muscles which keep the head in the horizontal position have to support it with a mechanical disadvantage at the end of a lever G *g*; and it will be found that it cannot be sustained in that position, even for a short period, without great fatigue, which is not felt in the erect posture. It will also be observed that the eyes would be directed towards the ground, so that a man could not look horizontally forwards without difficulty, nor vertically upwards at all, both of which actions are essentially necessary to the pursuits and habits of the human race. In the lower animals the case is quite different; for, if we take the horse as an example, we find that the centre of gravity of the head is brought nearer the joint uniting the head with the neck in the horizontal than in the erect position, as will be seen in *Fig.* 3, where G and *g* are the centre of gravity of the head, and joint of the neck, as before; *a* G is a horizontal, and *a g* a vertical line. In the natural position the weight of the head acts at the end of the lever *a* G; but, if the animal were standing erect on its hind-legs, this weight would act at the extremity of the lever *a g*, which is longer than *a* G, and, consequently, more force would then be necessarily expended in supporting the head. Also, from the position of the eyes in the head, the horse would look directly upwards, and could not direct them to the ground. These considerations alone are sufficient to enable us to come to the conclusion that man is not organized to move as a quadruped, nor quadrupeds as man; and, moreover, in the posture of the quadruped, the whole sole of the human foot would not reach the ground, but the toes only; and he would become a digitigrade, instead of being, as he is now, a plantigrade animal. In the position of a quadruped, also, if the hands and arms were employed to contribute to the support of the head and trunk, they would no longer be free to perform all those various offices to which these organs are manifestly adapted.

Fig. 1.



Fig. 2.



Fig. 3.

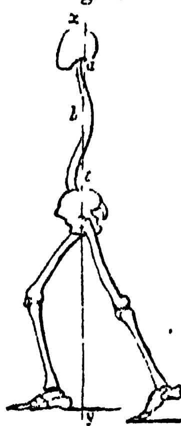


Let us again, in illustration of this subject, turn our attention to the structure of that most beautifully framed organ,—the human hand, and investigate its complex structure, its manifold segments, its numerous joints, its extensive motion, the position of the thumb, the power which it possesses of grasping objects, of twisting upon itself, as in the use of the gimlet, and its sensibility of touch, and let us compare with these wonderful properties the solid mass in which the arms of the horse terminate; a glance will be sufficient to convince us that in man the hands are naturally designed for the several functions which they actually execute, and that their complex mechanism would be quite thrown away, were they simply used for progression; which is the thing we intended to prove. Some naturalists have erroneously imagined that the erect posture of man is not the effect of the organization of his body and limbs, but the result of the development of his mental faculties; that persons have been found moving on their hands and feet when deprived by circumstances of intercourse with their fellow-creatures from childhood; and that children in civilized life, during the first months of their existence, move both on their hands and feet; and, therefore, that the erect posture results from education. The principle, however, which we have already established respecting the position requiring the least expenditure of muscular force, is quite sufficient to refute these erroneous views; and it must be remembered that a person shut out from the rest of mankind is not in his natural condition, neither is infancy the perfect state of the human race.

There is a considerable difference in the figure of the vertebral column of man and of the lower animals; in the former it is constructed to bear the greatest weight in the erect, but in the latter in the horizontal position. In man the vertebral column (or, as it is more commonly called, the back-bone) is divided, from the head to the lower part of the loins, into twenty-four joints. Between each bone of the back there is a very elastic substance interposed, of such a nature as to bear the pressure of the bones without injury, to enable them to be twisted and bent upon each other

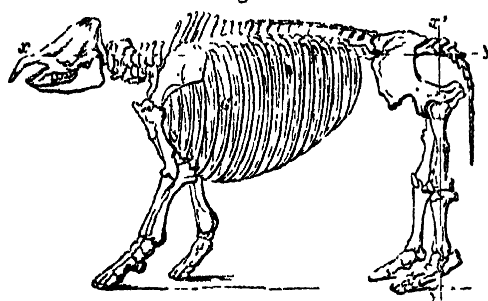
without coming in contact, and thus to avoid the injury that would result from friction. It might be supposed at first sight that a chain of bones, piled upon each other, separated by so many joints, and capable of moving in various directions, would be a weak and imperfect organ, when considered as a pillar to support the head and body: this, however, is by no means the case; for, independently of its office in upholding the head and trunk, each bone is hollow, so that the vertebral column forms a tube for the passage of the spinal marrow or cord, which it encases, and protects from external violence, in all the varied occupations of life. Destined, then, as the bones of the back are to protect so important an appendage of the brain, and to support the weight of the head and trunk, special care has been taken by the all-wise Creator to construct each bone with sufficient strength for these purposes; we, consequently, find the bones of the neck, which have the least weight to bear, the smallest, and that they gradually increase in size down the back to the loins, where they are the largest. Each bone of the back is bound so strongly by ligaments to the one above and below it, and its figure is so constructed to lock into the adjoining bones, that no common force will disunite them: indeed, so firmly are the bones of the back bound and locked together, that a force sufficient to crush the body of the bone will alone separate them. A fracture of this kind is, accordingly, one of the most serious accidents that can befal a man, and, in fact, death most commonly results from it. The vertebral column is not straight, but curved in three places, as shown in *Fig.* 4. At *a*, the neck, the spinal column lies in front of the vertical line *x y*; at *b*, the back, part of the column supporting the shoulders lies behind the same line; and at *c*, the loins, the column again lies in front of it. Now, it may be imagined by some persons that this curved condition of the back is a defect and a source of weakness, but it is, on the contrary, a condition of security and strength; for, the jars incidental to walking, leaping, and heavy blows, coming vertically on either extremity, are thus transmitted obliquely through the whole column, so that much of their violence is lost. Moreover, it has been found by Euler that an elastic rod, when slightly curved, will bear upon its end a much greater weight than if straight; and if the number of small curves be three, the weight it will sustain will be the square of three, with one added, or 4×4, that is, sixteen times greater than if it were straight. Now, if we may consider it admissible to apply this principle to the human vertebral column in bearing a burden on the head in the erect posture, we shall see that, in this posture, a man is capable of carrying, or rather supporting, such a load as would almost break the back in a prone position.

Fig. 4.



We observe that the bones of the back, or vertebral column, are also curved in the lower animals; but, instead of forming several curves in opposite directions, as in man, it forms one large arc, which is convex upwards, when the spine of the animal is directed horizontally. This form of the bones of the back in quadrupeds is conspicuous in the Ruminantia and Pachydermata; for instance, in the rhinoceros, as seen in *Fig.* 5, the whole of the column lying between *x* and *y* forms one large arch with its concavity directed downwards; and, as each bone which enters into the composition of the arch is bound to the adjacent bones by ligament, or fibrous cord, of great strength any force or load laid upon the back of the animal, in its natural prone position, by tending to bring that portion of the spine lying between *x* and *y* into a straight line, tightens these cords; and thus the spine itself is capable of bearing as much, or perhaps more weight than the limbs of the animal could carry in its natural position: but, if the load were laid on the top of the spine, instead of across it, on the supposition that the body of the animal assumed an erect posture, the arch of the back would increase, and the spine would be broken by the same load which it would easily bear when laid across it. Here, then, we have another illustration of a quadruped requiring a prone position derived from the constitution of its vertebral column. Independently of this, if we were to examine the relative positions of the joints, we should find that, when a quadruped is placed in an erect posture, a vertical line passing through the centre of gravity of the head and the axis of the joint which unites it to the trunk, does not, and cannot pass through the centre of gravity of the animal, G, and the hip, knee, and ankle joints at the same time, as in man; neither can the horizontal line *x y* be brought to coincide with the vertical line *x' y'*: and, that therefore, the erect position of a quadruped is not that of least expenditure of muscular action, which we maintain is the position natural to every animal in the act of standing.

Fig. 5.



FLOATING ISLANDS AND GARDENS.

THERE have been, and yet are, many islands or islets which float in water, and have no solid foundation beneath them. A fact so contrary to our usual experience may seem strange; but there are in most instances the means of forming some idea of their mode of production. A few of the most remarkable may not be unworthy of a slight notice.

The floating islands and gardens of Mexico, though now little regarded, were at one time of great celebrity. When the Mexicans were brought into subjection to the Calhuan and Tepanecan nations, and confined to some small islands in a lake, they ceased for some years to cultivate the land on account of their limited space; but at length necessity and industry taught them to form moveable fields and gardens, which floated on the waters of the lake. They first formed a foundation, or kind of boat, of wicker-work, about eight perches long by three broad, and matted it with water-plants and mud. On these floating foundations, when supplied with manure and mould, they cultivated maize and other useful plants; but afterwards they formed gardens of flowers and odoriferous plants, which were used for the houses of the nobles and for the worship of the gods. Humboldt says that these floating gardens still exist. They are of two sorts: the one mobile, and blown here and there by the wind; the other fixed and united to the shore. Flowers and every sort of garden-herbs are cultivated on them, and

thrive abundantly. In the largest gardens there is commonly a little tree, and even a little hut to shelter the cultivator from the sun and rain. When the owner of a garden wishes to change his situation, to remove from a disagreeable neighbour, or to come nearer to his own family, he gets into a boat, and by his own strength alone, if the garden be small, or with aid if it be large, he tows it after him, and conducts it where he pleases, with the little tree and hut on it. The city of Mexico is said by Mr. Bullock to receive an ample supply of culinary vegetables from these floating gardens.

In Cashmere there are floating gardens which have been spoken of as highly beautiful. The city of Cashmere is divided into different isolated portions by small lakes and streams, and the low ground is very liable to be suddenly flooded. As a means of avoiding the inconveniences to which this state of things would expose gardens cultivated in the usual way, the inhabitants are accustomed to make gardens on little floating islands in the lakes. Moorcroft describes the formation of these gardens to be nearly as follows:—Various aquatic plants, such as reeds, water-lilies, &c., spring from the bottom of the lakes to the surface of the water, and there form a green fringed surface. The boats which traverse the lakes, taking in general the shortest way to their respective places of destination, cut various tracks or paths through the weeds. On the sedgy patches thus left the farmer establishes his melon and cucumber floats, by cutting off the roots of the aquatic plants about two feet under water, so that they lose all connection with the bottom of the lake, but still remain connected in a group. He then presses them together in closer contact, and forms them into beds about two yards in breadth, and of an indefinite length. The heads of the sedge, reeds, and other plants are then cut off and left on the surface of the float, over which is laid a thin coat of mud. This forms a kind of continuous substratum by insinuating itself through the stems of the plants. The float is prevented from being driven about by the wind by driving willow-stakes through it at each end, and which do not prevent it from rising and falling with the rise and fall of the water. When the surface is properly prepared, the farmer introduces into it cucumber and melon plants which he had previously raised under mats, planting them at a distance of two feet apart, after which no further care is required till the fruit is to be gathered. Some of these little garden-islands will bear the weight of a man; but in most cases the farmer rows in a boat to the side of the garden, and there conducts his labours. Moorcroft speaks of the growth of cucumbers and melons on these spots as being singularly luxuriant and successful. Mr. Vigne, while speaking of the appearance of the lakes near the city, says:—"Numerous villages on the edge of the water, surrounded with walnuts and chenars, are taken into the *coup d'œil;* a green causeway which is extended across it is an object of attraction; but we look upon the famed floating-gardens of Kashmir (this name, like most of those relating to oriental subjects, is spelt very differently by different writers), without being able to distinguish them from the green and richly cultivated grounds upon that edge of the water which borders upon the city."

Islands formed of drift-wood are in some respects more remarkable than the floating gardens above described, for they are formed, often on a large scale, by natural causes. Floating islets of matted trees are sometimes seen sailing at the distance of fifty or a hundred miles from the mouth of the Ganges, with living trees standing upon them. The Amazon, the Congo, and the Orinoco present similar phenomena. Spix and Martius relate that during their travels in Brazil they were exposed to great danger while ascending the Amazon in a canoe, from the vast quantity of drift-wood constantly propelled against them by the current; so much so, that their safety depended on the crew being always on the alert to turn aside the trunks of trees with long poles. The tops alone of some trees appeared above water; others had their roots attached to them with so much soil, that they might be compared to floating islets. On these islets the travellers saw numerous animals, strangely mingled in companionship. On one raft were several strange-looking storks, perched by the side of a party of monkeys, who made comical gestures and burst into loud cries on seeing the canoe. On another was seen a number of ducks and divers, sitting near a group of squirrels. Next came down upon the stem of a large rotten cedar-tree an enormous crocodile by the side of a tiger-cat, both animals regarding each other with hostility and mistrust.

Green rafts, composed principally of canes and brushwood, are called 'camelotes' on the river Parana in North America: they are occasionally carried down by inundations, bearing on them pumas, caymans, squirrels, and other quadrupeds, who always appear terror-stricken while on these floating habitations. Four pumas were landed in this manner in one night at Monte Video, to the great alarm of the inhabitants, who found them prowling about the streets in the morning. Captain W. H. Smyth told Mr. Lyell that he had often, when cruising among the Philippine Islands, met floating masses of wood with trees growing upon them: ships were sometimes in imminent peril from these rapidly moving masses being mistaken for islands. Another naval officer relates that while returning from China he encountered near the Moluccas several small islands, covered with mangrove-trees interwoven with underwood. The trees and shrubs retained their verdure, receiving nourishment from a stratum of soil which formed a white beach round the margin of each floating islet, where it was exposed to the washing of the waves and the rays of the sun; this soil having arisen from the earthy sediment left by the water in all rivers and straits where such rafts are likely to be found.

The river Mississippi, from the existence of vast forests near its banks, is liable to be interrupted by the formation of floating islands far more remarkable than any we have yet noticed. One of the largest of these some years ago was called the raft of Atchafalaya, the latter being the name of one arm or branch of the Mississippi. This branch catches a large portion of the timber annually brought down from the northern part of the Mississippi; and the drift trees thus collected, in about thirty-eight years previous to 1816, formed a continuous raft no less than ten miles in length, two hundred and twenty yards wide, and eight feet deep. The whole rose and fell with the water, yet was covered with green bushes and trees, and its surface enlivened in the autumn by a number of beautiful flowers. It went on increasing till about the year 1835, when some of the trees upon it had grown to the height of about sixty feet. Steps were then taken by the State of Louisiana to clear away the whole raft and open the navigation; which was effected, not without great labour, in the space of four years.

Near New Orleans, where the immense body of water from the Mississippi and its tributaries enters the Gulf of Mexico, large log islands are formed in great number, by a process of which the following are the chief steps:—In the early part of the spring, when the 'freshets' or 'floods' occur, they bring along with them millions of trunks of trees, which become entangled or matted together in a kind of gigantic network, several fathoms in depth: they become cemented by earthy deposits, and a rank sort of cane or reed

springs up, which helps to unite them. This fringe of reeds retains the mud brought down the river afterwards; and every year then brings its fresh logs, fresh reeds, and fresh mud, followed by the growth of stunted shrubs.

In the higher parts of the Mississippi these floating islands become fixed encumbrances of a most formidable kind. There are many sudden bends in the river, and the current at these parts often undermines the banks, and plunges thousands of trees at one dash into the river. The greater number of these trees are swept down to the sea, there assisting to build up the log-rafts just alluded to; many are stopped in their progress by islands standing in the way; while some float into the shallow water between these islands and the main, where they grow into rafts several miles in length, and form, along with the mud deposited by the river, the substratum of future land. But some of the largest of the trees, after being cast down from the position in which they grew, get their roots entangled with the bottom of the river, where they remain fixed to the mud. The force of the current naturally gives their tops a tendency downwards, and soon strips them of their leaves and branches. These fixtures, called 'snags,' or 'planters,' are very dangerous to vessels going up the river, since they have their pointed or rugged ends directed obliquely so as to encounter the vessel in its progress, and in such case the bottom of the vessel is extremely liable to be pierced through These formidable snags sometimes remain so still that they can be detected only by a slight ripple above them, not perceptible to inexperienced eyes; but sometimes they vibrate or rock to and fro, alternately showing their heads above the water and dipping beneath it; a movement which, in the odd language of the West, has earned for them the name of 'sawyers.' To guard against these 'snags' and 'sawyers,' many of the Mississippi steam-boats are provided with a safety arrangement called a 'snag-chamber.' At a distance of twelve or fourteen feet from the stem of the vessel a strong bulkhead is carried across the hold from side to side, as high as the deck and reaching to the keel. This partition, which is formed of stout planks, is caulked and made so effectually water-tight, that the foremost end of the vessel is cut off as entirely from the rest of the hold as if it belonged to another boat. If the vessel happen to run against a snag, and a hole be made in her bow under the surface of the water, this chamber merely becomes filled: for the communication being cut off from the rest of the vessel, no further mischief need ensue.

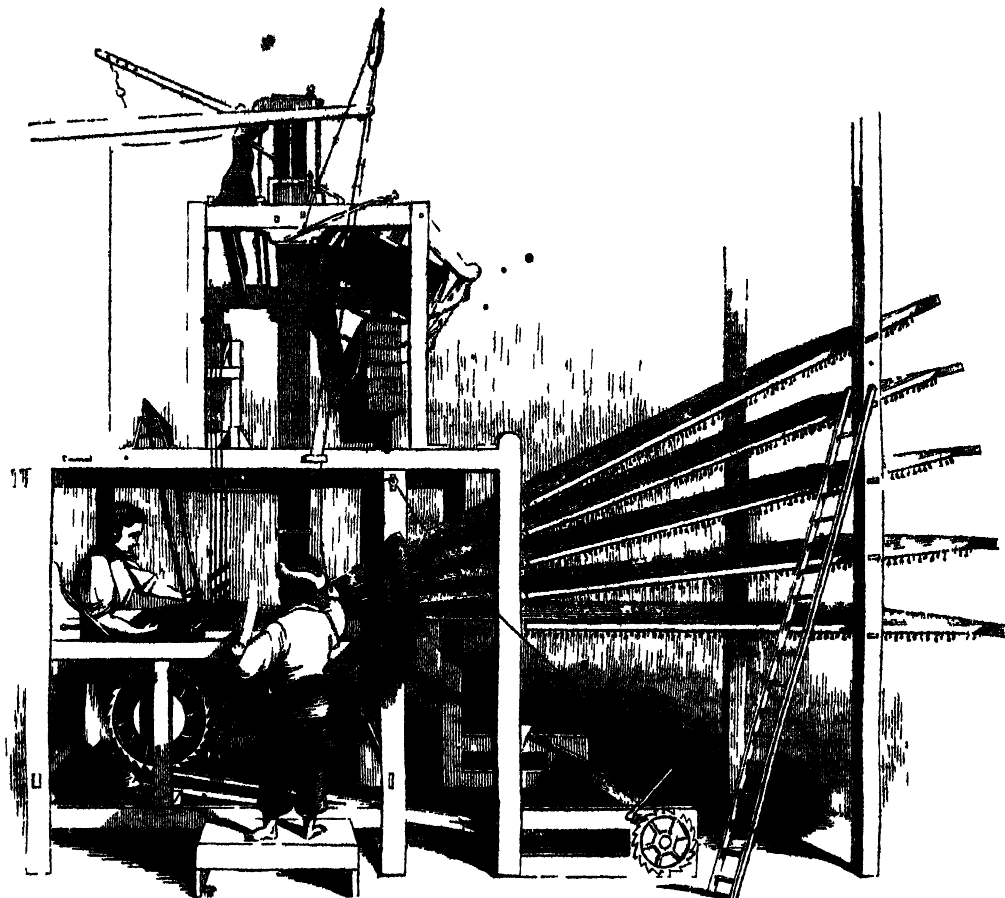
A floating island in Keswick Lake, in Cumberland, has been the theme of much conjecture for many years. From an account of it, by Mr. Otley, published some years ago in the 'Manchester Memoirs,' it appears that the place where the island occasionally makes its appearance is in the south-east corner of the lake, not far from Lowdore, generally about a hundred and fifty yards from the shore, where the lake is from three to six feet in depth. The times of its appearance are irregular and uncertain: it has sometimes been observed in two successive years; at other times with an interval of seven or eight years, and mostly about the termination of a warm dry season. Its figure and extent are also variable; sometimes comprising nearly an acre of ground, and at others only a few perches. It is entirely covered with vegetation: its surface, to the depth of a few inches, is composed of a clayey or earthy matter, apparently deposited by the water; and the rest is a kind of imperfectly formed peat-moss. After an absence of eight years, it emerged on the 20th July, 1808, and increased for a few days till about eighty yards in length. It remained unaltered for some weeks, with its surface about a foot above the level of the water; but it then lowered gradually till the beginning of October, when it sank beneath the surface, and was not seen again till 1813, at which time it rose and remained visible for about six weeks.

Much controversy has arisen respecting the cause of this phenomenon. Some attribute the rising of the earth or peat, or whatever it may be, to the rarefaction of air under it by heat; others thought that a small rill or brook, falling from the mountain opposite the place, might possibly meet with a subterraneous passage, by which it enters the lake unperceived, and reaches to this spot; and that during a dry season its outlet may be so far choked up that on the commencement of rain the confined water may force up this island. Dr. Dalton, in 1815, made an experiment on the island, with a view to determine the nature of the gases which it was frequently known to evolve. He thrust a stick a foot deep into the soil of the island, and out of the hole ascended a mixed gas of nitrogen, carburetted hydrogen, and carbonic acid. Mr. Otley had before given an opinion that the ascent of the island to the surface of the water was due to the presence of a large quantity of gas in the spongy material of which the island is formed; and in reference to this opinion, Dr. Dalton remarks:—"Mr. Otley has, I apprehend, suggested the only plausible cause that can be assigned for the rising and sinking of the island. The generation and temporary adhesion of such immense quantities of elastic fluid must have great influence upon the specific gravity of any mass; and when the mass happens to be nearly of the same specific gravity as water, and immersed in it, it will sink or swim according as the adhering volume of air is less or more.

In Esthwaite Lake, Cumberland, a floating island exists which has conveyed as many as fifteen persons at once across the lake.

Ireland in the Sixteenth Century.—And there is also a certain other island, called Hibernia, and Ireland as well, large and populous. For it measures 600 miles; being not further distant towards the south than thirty-five miles from the island of the English. It possesses towns and cities. But the inhabitants reject political institutions, and other importations, with whatever else pertains to them. And it is no long time since it has been reduced under subjection to the king of England; and from him it receives its administration. . . The island Hibernia, then, is of a fruitful nature, and yields corn, and furnishes animals of all kinds; and whatever things are in England and Scotland, in none of these is it inferior. But yet they do not pay so much attention to civil polity. As many, indeed, as live in cities and walled towns have something of human polity and administration. But such, on the other hand, as live in forests and bogs are entirely wild and savage; and there remains only the human form whereby they may be distinguished to be men. They are tall fair complexioned, and rather light-haired; wearing much hair on their heads and having a shaggy beard. They go at all seasons without any other clothing than that which covers their loins; and neither heat nor cold annoys or enfeebles them. But they devote themselves to archery, and practice running with excessive endurance, so as frequently to contend in speed with horses and hunting-dogs. And they gird on their thigh a barbaric sword, not very long, and in their left hand they carry certain javelins. And they throw with so good an aim, that their skill in hitting the mark is by many thought to be marvellous. They wear neither covering to their head nor shoes to their feet; are swift of foot, and engaged in battle hand to hand; habituating themselves to feats of desperate courage and hardihood. And as many of them as appear to live in a more civilized manner, having sewed together vestments of linen and hemp of all colours, clothe themselves in garments extending to their feet, and made after a barbaric fashion. And their wives also are accustomed to wear something of the same kind. . . They feed on everything, and gorge themselves to excess with flesh. They are continually eating milk and butter. And if the king of England need their service, they are able to muster to the number of ten thousand, or even more. And the men being valorous in feats of war, have frequently acquired renown.—*Travels of Nicander.*

A DAY AT A SCOTCH CARPET-FACTORY.



[Brussels Carpet Loom.]

THE good City of Glasgow—the "metropolis of the West," as it is termed in Scotland—presents many remarkable features as a centre of productive industry. Like Liverpool, it is the scene of vast shipping arrangements, receiving and despatching each day well-laden vessels from or to every quarter of the world. Like Dudley or Merthyr Tydvil, it is the centre of a rich mineral district, yielding iron in almost exhaustless abundance, and coal wherewith to smelt the ore thus obtained. Like Manchester, it is the centre of a cotton manufacturing district, presenting the whole of those gigantic arrangements incident to this branch of manufacture, from the carding and spinning of the fibres, to the dyeing, bleaching, and printing of the woven fabrics. Like the West Riding of Yorkshire, it exhibits—both within its precincts, and in the various towns by which it is engirdled—a multitude of establishments wherein woollen or worsted are worked up into various woven fabrics. There is perhaps no other of our great towns which presents the features of a manufacturing centre in such a marked way as this, since shipping, iron, and woven fabrics are, it must be confessed, of rather opposite character as agents in the commercial prosperity of a town.

Among the establishments last alluded to, viz., those for the woollen and worsted manufacture, is one which will occupy the chief part of our attention in the present paper. It is a Carpet Factory, in which the whole circle of operations, from the washing of the dirty fleece to the shearing of the woven carpet, is conducted. The nomenclature familiarly applied to carpets is—like many other instances of manufacturing phraseology—ill calculated to convey an idea of their distinctive features or of their mode of manufacture. The terms Scotch, Kidderminster, Wilton, Brussels, Turkey, Persian, Venetian, &c. as applied to carpets, no longer strictly indicate the places of manufacture, however applicable they might have been in the first instance. Indeed, there is no little confusion in the matter, for 'Scotch' carpets and 'Kidderminster' carpets are the same. 'Venetian' carpets were never, it has been asserted, made at Venice at all. 'Brussels' carpets are made at Kidderminster; while 'Kidderminster' carpets are not made in that town so extensively as in Scotland. These anomalies apart, however, we will endeavour to give such a sketch as will illustrate the broad features of the manufacture generally, and for this purpose it matters little where we

take up our station, provided the manufacturing arrangements are sufficiently complete.

Glasgow is plentifully provided with suburban parishes or districts, the names of which afford a convenient mode of distinguishing the different parts of this very busy city. The whole of that portion of the city south of the Clyde is in this way distinguished; and Port Eglinton, where the factory is situated, which we are about to visit, is at the southern margin of the whole. If we start from the Jamaica Bridge—or, as it is called *par excellence*, for its importance, "Glasgow Bridge"—the eastern boundary of the busy "Broomielaw," or harbour of Glasgow, a southern route leads us to the establishment whose tall chimney and many-windowed front indicate factory operations within. Within the gates of this building, then, we will suppose ourselves to be placed, and will glance around. There are two or three long open courts or yards, bounded on either side by the workshops wherein the manufacture is carried on; and at the farther end are the boilers, furnace, chimney, &c., belonging to the steam-engines which supply moving-power to the machinery.

It is necessary here to mention the connection between the spinning and the weaving in carpet-work. We had occasion, when describing the Cotton-manufacture in a recent Supplement, to explain that the spinning and weaving of cotton are not necessarily carried on in one establishment, or by one firm: some being "spinning-factories," some "weaving-factories;" and some both conjoined. The same remark is applicable to the Carpet-manufacture, with this modification, that the worsted is rarely spun in the same factory where the carpets are made. At Kilmarnock, at Kidderminster, and other towns where large quantities of worsted are used, there are "worsted-mills," the owners of which prepare spun-yarn, and sell it in a spun state to the carpet, shawl, tartan, &c. manufacturers. Occasionally, however, the spinning is conducted in the weaving factory, and this happens to be the case in the establishment which we have been obligingly permitted to visit, and which is also convenient for our purpose, inasmuch as three different kinds of carpeting are there made. Under these circumstances, therefore, we will glance at worsted spinning before noticing the actual manufacture of the carpets.

The wool reaches the spinner in two forms; *fleece-wool* and *skin-wool*: the first being that which results from the shearing, and the latter being the wool taken from the animal when killed. The former is the better of the two, but both are employed. The wool comes in bags containing about ten stone each—a 'stone' in this commodity being 24 lbs.—therefore equal to 240 lbs. per bag, technically called a 'pack.' The bags are in the first place stowed away in a long shed or warehouse; from whence they are transferred to an upper floor, occupied as a sorting-room. Here a number of men stand at benches in front of a range of windows; and the wool, when taken from the bags, is placed on these benches to be sorted. So different is the mode of growth on different parts of the animal's fleece, that as many as ten different qualities of wool are procurable from the same fleece; some best fitted for the warp of the carpet, some for weft, some for coarse work, some for fine, &c.; and it is the office of the sorters to separate the fleece piecemeal into its various qualities.

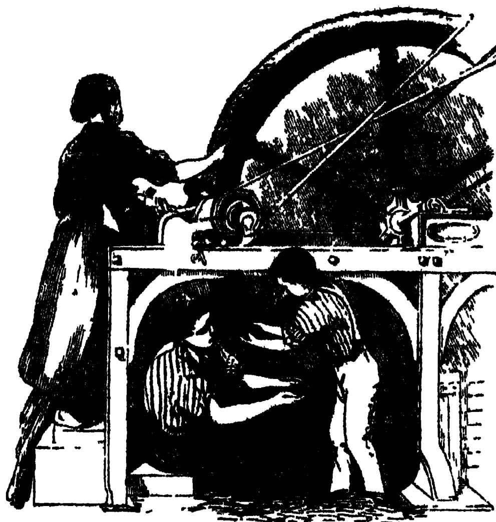
The wool, thus separated, is next transferred to a lower building, where it is washed, scoured, or cleansed from the grease adherent to it. The washing is a very simple affair, but the 'wringing' or draining is ingeniously effected, thus:—There is a wooden vessel filled with a hot ley of soap, soda, and water, into which the wool is dipped; and after a little stirring, the wool is lifted up by a kind of pitchfork, and held where it can be caught between two rollers, which by great pressure force out the water from the wool, leaving it nearly dry. To complete the drying, the wool is then taken to a hot-room, where an economical use is made of the heat radiating from the boilers of the steam-engine: the drying-room is over the boiler-room, and is thus effectually heated by caloric which would otherwise be wasted. This is only one among many instances which our manufactures exhibit, wherein the possession of a steam-engine yields benefits not originally contemplated when it was erected; such, for example, as a supply of hot water from the condensed steam, the warming of a whole factory by steam, the heating of rooms for drying goods, &c.

The sorted, cleansed, and dried wool then undergoes processes by which its fibres are brought more or less into a parallel position, preparatory to the operation of spinning. In the cotton manufacture the process of 'carding' is that by which the fibres are laid straight; but in the preparation of wool some kinds require a different mode of procedure, called 'combing.' Supposing the wool to be of that kind or for that purpose which requires carding, the routine proceeds thus:—The wool is first placed near a revolving cylinder, called a 'teazer,' whose external surface is studded with bent hooks; and these hooks, catching hold of the locks of wool, disentangle and open them, separating them fibre from fibre, and preparing them for the 'cards.' These cards are points or wires, much finer than the hooks of the 'teazer,' and disposed around the exterior of a long series of cylinders: the wool is caught from one cylinder to another, twenty or thirty times in succession, whereby all its fibres become arranged very nearly in a parallel layer; and after leaving the last cylinder, it assumes the form of a delicate, tender riband or 'sliver' about two inches in width.

The 'carding-machines' employed in this operation are very large and complex pieces of mechanism; and ten or a dozen of them, arranged side by side, give a very busy appearance to the 'carding-room.' They are almost automatic, requiring very little personal attention.

The 'combing' of the wool is another mode of separating the fibres from their knotted locks. In the preparation of hemp for ropes, and of flax for linen, the fibres are disentangled by means of an instrument called a 'heckle,' consisting of a number of teeth or spikes inserted in a board; and a somewhat similar plan is adopted for wool. The fibres are torn one from another in three different ways, all involving, however, the same general principle of action. In the simplest mode of proceeding, the wires of a kind of large comb are heated, and the comb being fixed with the wires uppermost, the wool is laid on them, and combed out by the teeth of another similar comb. This is the method for the finest wools. That of coarser quality is placed on the surface of a revolving roller, and combed out by passing on and between the points of a kind of heckle. There is, however, another and a larger machine, which acts in a remarkable manner. It consists of two large wheels, six or seven feet in diameter, rotating so that their peripheries may be nearly in contact. The periphery, or circumference, of each wheel is formed by a series of wires or spikes, on and between which the wool is placed: the wires on the one wheel then comb out the wool on the other, and at the same time separate it into two portions—short fibres, called 'noils,' and long fibres, called 'top'—which are afterwards used for different kinds of work. The short fibres are taken from the wheel,

in a bunch, by another boy or girl, while a third removes the longer fibres in a continuous but irregular string. The portion of the machine at which the juvenile operatives are engaged is here sketched. Without detailing the particular circumstances under which 'carding' or 'combing' are resorted to, or the respective purposes to which the 'noils' and the 'top' are applied, it will suffice to say that all this is preparatory to the



[Combing-wheel.]

spinning of the yarn: it may, however, be explained that the long 'combed' wool is used principally for Brussels and the finer kinds of carpeting, while 'carded' wool is employed for Scotch or common carpets.

We next transfer our attention to a long shop or room wherein the worsted is 'drawn' and 'roved,' processes precisely analogous in principle, and nearly so in details, to those pursued in the cotton manufacture. The fibres are passed between rollers, doubled, passed again between rollers, and so on many times in succession, until they have assumed a degree of parallelism almost perfect; and, being in this state, they are brought to the form of a loose tender cord, about an eighth of an inch in diameter, called a 'roving.'

The rovings are spun into yarns for the weaver by the usual action of the 'throstle' and the 'mule' spinning-machines. The spinning rooms are the finest part of the factory; long, airy, well-lighted, and filled with the machines whose revolving bobbins reduce the roving to the state of yarn. All the spinning-rooms are attended by the bare-footed damsels whose duty it is to mind the machines, and whose appearance marks one of the points of difference between the working classes of England and Scotland. In England it is very rare indeed to see either sex, especially females, without shoes and stockings, except in the very humblest and most depressed classes of the community: the stockings may be full of holes, and the shoes may have scarcely any 'under leathers' to keep the 'uppers' together; yet, such as they are, we everywhere see them. In Glasgow, however, and in most parts of Scotland, the absence of feet-coverings is by no means an evidence of extreme poverty or slovenliness. When Jeannie Deans took off her shoes and stockings, and carried them in her bundle during part of her journey to London, she only followed a well-understood practice among her countrywomen. In the kitchens of many taverns and respectable houses of Glasgow, at the present day, the female domestics have neither shoes nor stockings on; and out in the open streets, especially in the vicinity of the Broomielaw and of the Salt-market, gold ear-rings and pink bonnets, and silk ribands and shawls, may frequently be seen accompanied by bare ankles. When, therefore, we meet with similar instances in a spinning-mill, we may attribute it not to any peculiarity attending the occupation, but to the custom of the place.

But to return. Some of the spun-yarns are doubled and twisted again, to make strong threads for the warp of the carpet; while others are prepared, so as to present more elasticity than strength, for use as weft or cross threads. When, however, the spinning is finally effected, the yarn is carried up to the 'reeling-shop,' where a number of hexagonal frames or reels are at work, on to which the yarn is wound, in the same manner as the silk in a silk-mill. Some of these are called '4-quarter reels,' some '8-quarter;' and the yarn, after being removed from them, is wound up into hanks, and the hanks into bundles.

So far as this factory is a worsted-mill, we may now leave it, since the worsted-spinner's operations are at an end when the spun-yarn is bound up into hanks and bundles, and the bundles may be either sold to other manufacturers or worked up by the looms of the same factory. The dye-house is the next place to which we have to direct our attention. All carpet-worsted is dyed while in the state of yarn, sometimes by the carpet manufacturer, but at other times purchased by him in a dyed state. The dye-house at the factory which is the object of our visit is provided with the apparatus, mostly of a simple kind, for dyeing the hanks, which are opened so as to allow each individual yarn to be acted on. The usual mineral and vegetable colours are employed; and the yarn, after being dyed, is hung upon poles to be dried in a heated room.

We now approach that part of the operations in which the spun and dyed yarn is about to be woven into the form of a carpet: the warp threads to be attached to the 'harness' and 'heddles' of the loom, and the weft threads to be wound on the pirn of the shuttle. It must be familiarly known to every one who has ever examined the texture of different kinds of carpets, that very great diversity is exhibited by

them; and unless these diversities are borne in mind, the manufacturing arrangements can hardly be understood. Some kinds of carpet exhibit the same pattern and the same material on both sides, the colours only being reversed: another kind exhibits a woollen or worsted surface on one side, and a hard hempen or flaxen surface on the other: another kind presents all the appearance of a velvet surface, exhibiting the peculiar 'pile' or 'nap' which forms the distinguishing characteristic of velvet: another kind presents a richly soft surface half an inch in depth, in which the ends of the fibres, instead of their sides, are exhibited to the eye. It is obvious that very different arrangements of the weaving apparatus must be called for to aid in the production of these different kinds of carpet.

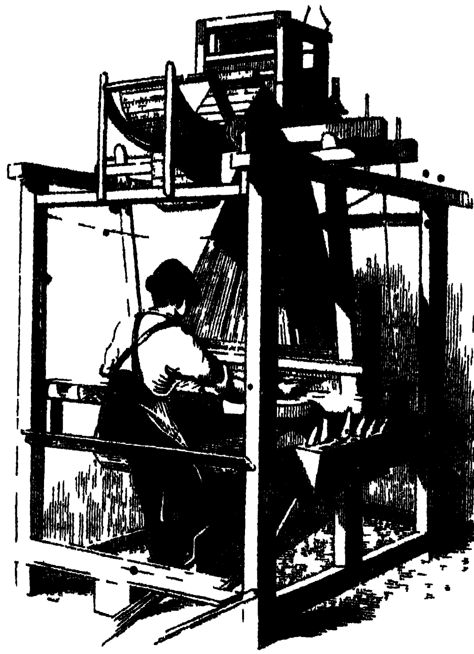
The first which we may notice is the common *Scotch carpeting*, which is woven in lengths about a yard in width, and then sewed together edgewise to form a carpet. This carpeting is formed without the admixture of any flax. The warp is of worsted and the weft is of wool; the difference between the two being that wool has shorter and finer fibres than worsted; and the fabric is so constructed as to constitute a double cloth, having two sets of warp and two of weft, each warp being intersected by both the wefts. It is, in fact, like two pieces of worsted cloth united together, surface to surface, and it might be possible to separate one from the other without destroying the web of either. Kilmarnock, a busy town eastward of Ayr and southward of Greenock, is one of the chief seats of this manufacture. It is stated in the recent 'Topographical Dictionary of Scotland,' that "the carpet manufacture may, amid many conflicting claims, be regarded now as the staple of Kilmarnock. Even twenty or twenty-five years ago it rivalled that of Kidderminster in England, and had no competitor in Scotland; and about that time, or a little later, it was greatly improved by the mechanical inventions of Mr. Thomas Morton, a citizen, who gives name to a locality in the vicinity of the Gas-Works, who taught his townsmen at once to save time and labour, and to achieve accuracy and an extensive variety in their patterns; and who, so early as 1826, received public demonstrations from the manufacturers of the town of the debt of obligation which they felt his genius had imposed.... The wages of the carpet and rug weavers run from 12*s*. to 14*s*. per week nett, and occasionally higher. The yearly value of the carpet manufacture was estimated, in 1837, at 150,000*l*. The carpet-factories are six in number." Brussels, Wilton, and Scotch carpets are made in Kilmarnock; but in that town, as well as in Scotland generally, the last-named variety is that which is most extensively made.

The general process of weaving Scotch carpeting is the same everywhere, and may be illustrated by the arrangements at the Port Eglinton factory. The weaving-shops are long rooms, having looms on either side, and a passage through the middle. Each weaver has his seat in front of his loom, where he drives the shuttle with one hand, regulates the shuttle-box and the 'batten' or 'lay' with the other, and works the treadles with his feet. No steam-power is employed, nor is an assistant necessary, as in some other kinds of carpet-weaving. The worsted warp-threads are arranged in two tiers, or, if it be a 'three-ply' carpet, in three tiers, by which a triple cloth is produced. Above the warp-threads is a very complicated assemblage of cords, called the 'harness,' the object of which is to draw up certain of the warp-threads for allowing the passage of the weft between them; and as the weaver, even if his feet and fingers were doubled in number, could not manage all these strings in their varied complexity, he is aided by an ingeniously constructed barrel, whose surface is studded like that of a barrel-organ. The studs are arranged on the surface in a certain determinate order, which depends on the pattern to be produced in the carpet; and when the barrel rotates, the studs, acting on several short levers, govern the movements of the warp-threads in a certain order, just as the arrangements of the pins on an organ-barrel act upon the pipes in a certain order according to the time to be played. As one organ-barrel, studded in a certain way, can only lead to the performance of one tune or set of tunes, so one loom-barrel, with a definite order of studs, can only lead to the production of one design in the carpet. The analogy between the two cases is so close, that we willingly make use of one to illustrate the other.

The mode of arranging the pins on the barrel depends altogether on the pattern to be produced, and this pattern is first drawn upon paper. There are designers for carpet-weaving, as well as for calico-printing; the artists in one case as in the other exercising their taste to produce new and elegant designs. We had occasion in the last Supplement to allude to the artists' room at a calico-printer's, and we may now similarly speak of one at the carpet-factory, the qualifications of the designer being the same, but developed in a different style of productions. From the designs the barrels are studded, and thus made ready for the loom; but every year witnesses the gradual decline of this mode of proceeding, the more efficient 'Jacquard' apparatus being used in its place. How this beautiful contrivance is brought to bear on the movements of the warp-threads, we had occasion slightly to notice in our sketch of the bobbin-net manufacture at Nottingham; and we may now mention that it is extensively used in the carpet manufacture. Sometimes there are as many as six hundred perforated cards for the production of one pattern, and two or three hundred levers or needles acted on by them.

The horizontal warp-threads, with the studded barrel or the Jacquard apparatus over them, form what we may term the permanent furniture of the carpet-weaver's loom; but the arrangement of shuttles is also very curious. There are from two to twenty shuttles for each pattern, the number being great or small according to the number of colours in the pattern. These shuttles are placed in a kind of box at the weaver's right hand, and he takes them out as he wants them. We may suppose that red, blue, and white, for example, alternate in the pattern: in such case he throws a red shoot with one shuttle; lays it down and takes up the blue shuttle, with which he throws a shoot; lays down this again, and takes up the white shuttle; and so on, keeping his hands incessantly employed, for he has not only to change the shuttles in this manner, but also to drive up each thread of weft as it is thrown. The arrangement of the barrel or the Jacquard apparatus is such, that when one colour, or one set of two or three colours, is done with for a time, a little bell is rung, by which the weaver is warned to place those shuttles in the side receptacle, and take others into use, according to the pattern. On the next page is a representation of the general appearance of a Scotch-carpet loom.

Let us next glance at a more expensive and finished carpet than the Scotch, viz. the *Brussels*. These likewise are made at the Port Eglinton factory, and by an arrangement which we will endeavour to describe. A Brussels carpet is composed of linen and worsted, the cloth or textile fabric being formed wholly of linen, and the worsted forming a kind of surface superadded to the fabric thus made. The mode of effecting this is highly curious:—The Brussels carpet-loom exhibits at its hinder end a series of frames, five or more in number, filled with bobbins of yarn; the frames being placed at such angles as to allow the yarn from all the



[Scot Carpet Loom.]

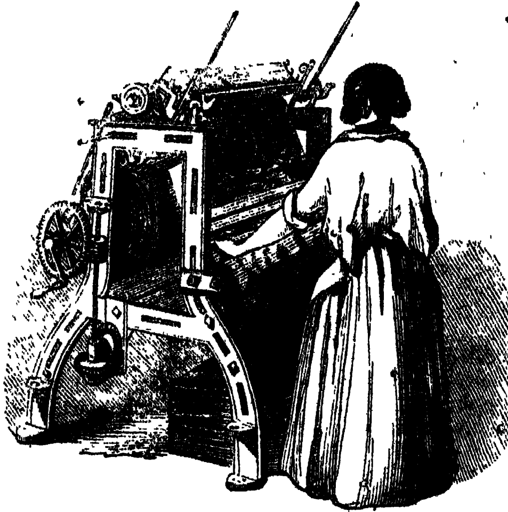
bobbins to unwind and form a uniform warp of threads. The weaver, sitting in front of the loom, is provided with a number of brass wires, each rather longer than the width of the carpet to be woven, and these wires enable him to give that ribbed or corded appearance which is so conspicuous a feature in Brussels carpeting. There are usually five colours in a Brussels carpet, and these colours are formed wholly by warp-threads, of which there are about two hundred and sixty of each colour in twenty-seven inches width of carpet. The warp-threads are governed by some such apparatus as in the former case, and when a 'shed' has been opened, the weaver throws a shoot or two of linen thread. He then introduces a wire under some of the coloured warps, and over all the rest, by which a series of loops is formed, which present a round and full appearance when the wire is afterwards withdrawn. He thus proceeds, throwing a shoot or two of weft, then beating them well up, then inserting a wire, then throwing more weft, and so on, repeatedly changing the colour of the uppermost warp-threads by mechanism connected with the treadles. At intervals he takes out all the wires, which have assisted in forming the ribbed-like surface of the carpet. One effect of raising the upper coloured warp in this way is wholly to hide the linen thread. The weaver is assisted by a boy in adjusting the 'shed' for the reception of the weft.

Taken in all its parts, the Brussels-carpet loom is decidedly a complex piece of mechanism, and requires for its due comprehension a very close attention, even from an eye-witness of its operation. Our engraving at the head of this article, though it cannot show the mode of action in this form of loom, will give some idea of its general arrangement and appearance. The same apparatus, with a slight alteration, is used for the production of *Wilton carpets*, which differ from Brussels chiefly in this—that the rib or raised part, instead of remaining whole, as in Brussels carpet, is cut by means of a sharp instrument, so as to form a velvet-like pile. The wires, instead of being smooth at the upper surface, have a groove running along the whole length, which assists the weaver in drawing a very fine knife across the worsted yarns which lie over the wire, and thereby severing them.

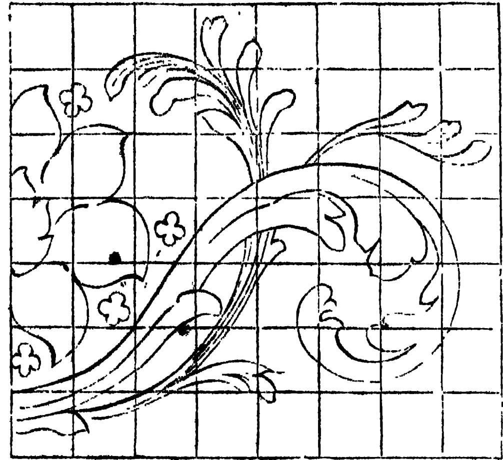
However different the common Venetian or stair-carpeting may appear to be from these finer kinds, yet it resembles them in this—that the warp alone forms the visible upper surface, the weft, which is sometimes woollen, sometimes linen, and sometimes cotton, being thrown in to form the fabric, but without showing at the surface. The warp is generally arranged in stripes of different colours and sometimes a kind of plaid pattern is produced, but generally the pattern is so plain as to require but little complexity in the weaving apparatus.

Most carpets, after being woven, require to have the surface sheared or cut, for the removal of loose fibres, and for regulating the length of nap in those which constitute pile-carpets. This shearing is effected by a very ingenious machine, in which a screw, whose worm or thread forms a cutting edge, revolves so that this edge shall come in contact with a straight horizontal edge, and thus act like a pair of scissors. The carpet is so adjusted as to be drawn between these two edges, by which the surface is sheared all over, the quantity cut off being dependent on the adjustment of the two cutting edges. The machine is represented on the next page.

Turkey or *Persian carpets* are the most costly and luxuriant of all, and are produced in a very remarkable way. They are not extensively made in this country, but there is an article of manufacture known as 'Persian rugs,' which will afford us some idea of the matter, and which is one of the kinds made at the Port Eglinton factory. The arrangements for making a Persian rug are these:—The warp is formed of linen-yarn, and is arranged vertically. Just above the level of the

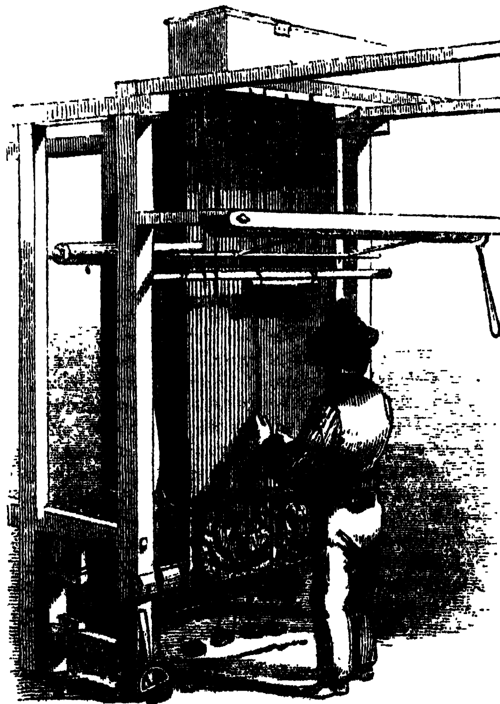


[Carpet-shearing Machine.]



[Persian-rug Pattern-paper.]

weaver's eye is placed a rolled-up paper pattern, on which the device is drawn, and which has crossed lines to represent the warp and weft threads, like the 'Berlin' patterns now so well known. If, in the annexed sketch, we suppose a number of other lines to be introduced between those here given (and which we have omitted, to avoid confusing the figure), it will represent a portion of one such pattern. The weaver is provided with stout worsted yarn of various colours, and twists this yarn round the separate warp-threads, twining it round two threads, and then cutting it off so as to leave two loose ends, say half an inch long each. He has scissors in his right hand, with which he cuts the worsted. He looks up at his pattern repeatedly, to see what coloured worsted is to occupy a particular spot, and to use the corresponding coloured thread. When he has knotted in a row of little tufts of worsted across the whole width of the web, he takes a shuttle in his hand, and throws in one or two shoots of stout linen-yarn, which keep the tufts in their places and assist in forming a firm fabric. The ends of each tuft stand out prominently, and by a subsequent dressing and cutting they form such a level and full surface as to hide completely the linen threads. This is throughout one of the most remarkable modes of producing a carpet, from its extreme simplicity, and the beautiful material which it produces; but it is necessarily a very slow and expensive process. The loom is wholly free from the complexity of 'barrel' and 'Jacquard' apparatus, and boys can work it effectively.



[Persian rug making.]

Such are the principal variations in the mode of producing carpets, apart from any consideration of the minute shades of difference which may occur in different factories, or of new or patented improvements, such, for example, as a mode of producing Turkey carpets wholly by weaving, which has been brought forward by a Glasgow firm, and which has led to the production of very beautiful fabrics.

PAISLEY SHAWLS AND HIGHLAND TARTANS.

Carpets, shawls, and plaids may not appear to have a very close connection one with another; but, in truth, the analogy, in a manufacturing point of view, is by no means distant; and we, therefore, will find a corner in our article for a few details relating to them.

Every one has heard of Paisley shawls; but few persons would be prepared for the vast extent to which the manufacture is carried on in that town. The whole town lives by shawls, almost as completely as Redditch does by needles, or Burslem by earthenware. If we place in one class or group all those inhabitants of Paisley who work directly at the manufacture of shawls, and into another all those who live by supplying the former with their daily necessaries, we should find that the two would go far to include the whole of the inhabitants of the place. It is not one particular kind of shawl exclusively which is thus associated with Paisley as a seat of manufacture; all kinds—silk, cotton, wool, silk and cotton, silk and wool, cotton and wool—all are manufactured here.

From the authority before quoted we learn that Paisley, as a seat of manufacture for spun fabrics, has gone through the following cycles of change. The Union with England, in 1707, was the moving power which first developed the energies of the townsmen, exhibited first in the manufacture of coarse chequered linen cloth; then imitations of striped muslins, called 'Bengals;' and then chequered linen handkerchiefs. After a time a lighter style of fabrics was introduced, such as plain lawns, lawns striped with cotton, and others ornamented with figured devices. Rather more than a century ago the making of sewing-thread, known by the names of 'ounce-thread' and 'nun's-thread,' was commenced, and carried on for many years to a very large extent. When cotton made its astonishing advance in our manufacturing districts, the Paisley linen-thread gave way to cotton-thread, which is still largely manufactured there. About the commencement of George III.'s reign, the Paisley weavers introduced a kind of silk gauze, which was so admirably wrought, as to supersede for a time everything else of the kind. The trade prospered greatly: companies came down from London to establish new firms at Paisley; and these firms not only employed the weavers of Paisley, but those also of all the villages in its vicinity, as well as establishing warehouses and agencies in Dublin, London, and Paris. But the article manufactured was one peculiarly dependent on fashion, and fluctuations took place so suddenly and completely, as to bring it to ruin. Under these circumstances the men of Paisley, instead of desponding, betook themselves to the muslin trade, which they raised to great eminence, and opened a field for the employment of a great number of females in tambouring or embroidering muslins. About thirty years ago the gauze trade again revived, and, together with the plaid or tartan trade, is now carried on to some extent; but all of these yield at present to the shawl manufacture, which, introduced about forty years ago, now forms the staple product of Paisley. There is something in this chain of events which might afford a lesson to the weavers of Spitalfields, who still continue weavers of silk and nothing else, whether there be much or little demand for their labour. There can be no doubt whatever that workmen, when their labour is bestowed on commodities which are keenly exposed to the fluctuations of fashion, ought to hold themselves prepared to strike out a new class of manufacture when one is declining; and this is what the Paisley manufacturers and weavers, much to their credit, seem to have done.

The value of the shawls manufactured in Paisley, in 1834, was estimated at a million sterling, and in subsequent years it has been much more. At the present time there are supposed to be four thousand 'harness' weavers, that is, weavers employed in the more complicated patterns of shawls; one thousand plain weavers; and three or four thousand 'draw-boys' or assistants, all employed in the shawl manufacture in Paisley; besides the large number of persons engaged in the subsidiary processes, and four or five thousand weavers in Bradford and its vicinity preparing the plain 'centres,' to which the Paisley men attach ornamental borders. It is pleasant to find at the present time, when so many branches of manufacture are in a gloomy state of depression, that the shawl-weavers of Paisley are almost every one actively engaged.

The town bears evidence of the avocation of its inhabitants, for we hear the clack of the loom in many a street as we pass along. The means of conveyance, too, between Paisley and Glasgow, show how great is the intercourse between the former and the Manchester of Scotland, as Glasgow may justly be termed. Although the distance is seven miles, yet it is traversed by railway for the trifling sum of 4*d.*; and not only so, but there are well-appointed steam-boats which run on the Clyde from Glasgow to Renfrew, where the travellers are transferred to a railway, three miles in length, to Paisley, the fare for steam-boat and railway combined being 6*d.*: it is true that on this latter railway there is horse-traction only, and carriages of a somewhat rude description, but still the maintenance of such fares seems to indicate a vast intercourse of working people between the two towns.

The shawl-factories of Paisley are not very numerous; the general system of manufacture being somewhat akin to that followed by the stocking-weavers of Nottingham. There are in various parts of the town 'shops' of looms, each 'shop' occupying the lower 'flat' or story of a building, and containing six or eight looms. These looms are owned by the operative weavers, one each, who pays a certain rent per week for 'standing;' or they are all owned by one person, who lets them out to the poorer class of weavers. Some of these looms are of a simple character, for weaving the plainer patterns; while others exhibit much more complexity of adjustment.

The general character of the processes of shawl-weaving bears much analogy to that of carpet-weaving, as we have before observed. In both cases the worsted yarns and the silk and cotton yarns for shawls are dyed before being used in the loom or the shuttle; in both cases draughtsmen are engaged to prepare patterns, which are divided into squares to facilitate the adjustment of the loom; in both cases the woven fabric passes through a shearing-machine to cut and level the surface. One of the most marked differences between them, however, is this—that the shawl has sometimes a plain centre, with a figured border at two or four of its edges; and in such case the border is woven as a broad web, containing several repetitions of the pattern, which are afterwards cut asunder, and each is sewn on to a shawl-edge.

In one of the Paisley factories, that of Messrs. Thomson, the following is the general character of the processes which we witnessed. In one room the 'lashing' or 'leashing' of the looms was being carried on, that is, the fixing of the harness or strings by which the warp-threads are governed. In the weaving-shops were about forty looms, some on the Jacquard principle, and some having the aid of a 'draw-boy' to form the shed for the weaver's shuttle. Some of the looms, in which six or eight differently-coloured wefts were woven into the shawl, had a curious appendage for bringing any shuttle to the proper place. The six or eight shuttles were placed on as many stages in a kind of vertical frame or scaffolding at each side of the loom; and by means of a kind of lever, governed by the weaver's left hand, he could bring down the frame, or lift it up, so as to bring any one shuttle on a level with his warp-threads. In some branches of weaving the same thing is effected by giving an oscillatory motion to the frame containing the shuttles. In all those forms of loom where a 'draw-boy' is employed to manage the movements of the warp-threads, he is engaged by the weaver himself, who pays the boy from 3*s*. to 4*s*. per week for his aid.

In one large room there were forty or fifty females seated on low stools, cutting the shawl-border webs into strips, and sewing them on the 'centres,' which may in some cases be plain, and in others decorated. Nearly all the shawls made at Paisley have 'borders' differently woven from the 'centres,' and which require to be sewn on by the aid of needle and thread. In some instances fringe constitutes the border, instead of a woven fabric; but both alike require the work of these females to attach them to the centres.

In another part of the establishment was the dye-house, where the yarns were dyed. Here the apparatus for dyeing was such as usually belongs to a dye-house, with the addition of a simple kind of press for shielding one portion of a hank of yarn while another portion is receiving dye, with a view to produce a peculiar effect called 'clouding.' In other parts of the building were calendering and pressing and packing rooms, to give to the manufactured article its final delicacy of appearance.

The screw-like shearing-machine, before described as in use in carpet-making, is likewise applied in shawl-making, but under a somewhat different arrangement. As there may not be shawls enough made at one establishment to employ one of the machines, several manufacturers send all their shawls to one shop or building, the owner of which charges a few pence for shearing each shawl. The system is, in fact, one of the many exemplifications of the advantage of "division of labour," so often exhibited in our manufactures. It also adds one to the proofs that "nothing is worthless;" for the cotton filaments sheared from the various kinds of shawls, after being separated by a chemical process from the worsted and silken filaments, are sold to make packing-paper. The sweepings of the shearing-shop sell for four or five guineas per ton.

When we have glanced at the various kinds of carpet on the one hand, and at the varieties of shawls on the other, we shall not have much difficulty in forming a general idea of the weaving of Plaids or Tartans. This branch of manufacture is carried on to a pretty good extent in Alloa, Alva, Tillicoultrie, and various other towns and villages around Stirling, as well as in Galashiels and other parts of Scotland farther southward; but the manufactured product for the most part finds its way to Glasgow, where the wholesale dealers, shippers, and warehouse-keepers have great facilities for prosecuting their business. This kind of centralization seems to some extent a natural consequence of large commercial arrangements, and is strikingly illustrated in Lancashire, where Manchester is the great depôt for woven goods produced at the factories of Bolton, Bury, Clitheroe, Blackburn, Rochdale, Oldham, Ashton, Stayley Bridge, Dukenfield, Hyde, Stockport, &c. Every year seems to afford increased indications that Glasgow is becoming such a depôt. We visited two such establishments, one of which—Messrs. Campbell's—is the largest in Scotland, wherein the vast assemblage of woven fabrics illustrates the use and necessity of classification. Four or five stories or 'flats' of an immense house are filled almost to overflowing with these goods: the Galashiels productions occupying one department; the plaids of the Stirling district occupying another; the shawls of Paisley a third; the printed cottons of Glasgow and of Manchester another; the hosiery of Nottingham another; and so on. These warehouses, unlike those in the neighbourhood of Cheapside in London, keep all kinds of 'soft goods' (as woven fabrics are called in Scotland), whether made of woollen, cotton, silk, or linen; and, moreover, at Messrs. Campbell's the wholesale and retail are so curiously combined, that while one customer may be making a large wholesale purchase in one room, a little barefooted girl may be purchasing a pen'orth of tape or of ribbon in another; and this, too, in an establishment wherein the sales are said to amount to little short of a million sterling per annum.

With respect to that portion of these goods which comprises tartans or plaids, there is a feature observable which scarcely any other exhibits, viz., a prevalence of particular patterns. Each Highland clan has a particular plaid, by which it is known, and which descends from age to age unaltered as to pattern. The warehouses, therefore, where these commodities are sold, have a certain degree of uniformity in their stock, arising out of this circumstance, each plaid having a well-known name and a well-known character. There are, however, fancy plaids, worn by would-be Highlanders, which have no definite character whatever. If any circumstance, such as a visit to the Highlands on the part of the royal or the high-born, should give an additional temporary popularity to plaids, all kinds of vagaries are produced in the way of patterns, widely deviating from the true clan-tartans. But no matter if a very young gentleman can show his smart-plaided stockings or cap, or if a young gentleman of larger growth can procure a plaid waistcoat or trowsers, he forthwith dubs himself a Highlander, and thinks of Roderick Dhu or Rob Roy, without stopping to inquire whether it be or not a recognised tartan.

As regards the materials of these tartans, they are of silk, or cotton, or worsted, or mixtures of two of these, much in the same way as shawls; but the weaving is much more simple, since, as the whole device is produced by stripes crossing each other and forming a check, it can be produced by a simple kind of loom. The threads of warp are arranged in their different colours, so as to produce the long stripes, while the shuttles of weft are of colours suitable to produce the cross stripes. There are sprigs, flowers, or ornamental devices, and the movements of the warp-threads are thus rendered so easy, that the weaver can regulate them by his treadles.



[a, Common Adder; b, Ringed Snake.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

SNAKES.

Of genuine snakes, for we exclude the slowworm, our island contains only two indigenous species, neither of which are to be found in Ireland: these two snakes, with the slowworm, and two species of lizard, constitute the sum total of our British Reptilia; and two species of frogs, two species of toads, and three of water-newts compose our limited catalogue of Amphibia. Of British terrestrial Mammalia, excluding domesticated species, we have about thirty-five or thirty-six species, of which fourteen or fifteen are bats. Of birds we have about two hundred and eighty-nine or two hundred and ninety species. Such are our statistics with respect to the terrestrial Vertebrata of our island. The paucity of our Reptilia, when we turn to the warmer regions of the globe, where they are not only specifically numerous, but where many of the species abound in incredible multitudes, is very remarkable: our latitudes are not congenial to the cold-blooded terrestrial Vertebrata; many, perhaps, will endure colder winters than ours, but they look for a hotter summer; most, however, luxuriate in the inter-tropical regions, the lands of the sun, and there attain to the maximum of their development.

Fearlessly does the truant schoolboy wander through the gloomy depths of our woods and wade through bog or morass in search of birds'-nests and their painted eggs; fearlessly does he swim the river: no ferocious beast of prey is lurking in ambush, no terrible boa prepares to make the fatal spring, no cobra rears its broad expanded hood and with gleaming eyes and opened jaws, hisses threats of destruction. From these dreaded ministers of death our island is free; the timid, indeed, may startle at the harmless snake as it rustles through the grass eager to escape observation, or recoil from the more sluggish viper sunning itself on the sandy heath, and indisposed to inflict the slightest injury if unmolested. These, in fact, are the only terrors of our woodlands or our waste-lands; and what are they, compared with the serpent-scourges of hotter climates, formidable from their strength and magnitude, or from the intense virulence of their poison? The common or ringed snake (Natrix torquata) is a beautiful and harmless creature, and may be readily tamed. It is abundant in low moist woods, damp meadows, and hedge-rows, especially in the neighbourhood of water, to which it

delights to resort, and in and around which its favourite food, the frog, is always to be procured. It often frequents gardens, attracted by the warmth of hotbeds and heaps of manure, in which the females deposit their eggs; for the same reason, as we can personally testify, snakes often frequent the sides and bases of limekilns composed of large rough masses of stone and turf, forming a thick mound, between the crevices of which they habitually conceal themselves. We well know a limekiln of this kind, in regular use, near the banks of a canal, in Staffordshire, where these reptiles abound; we have seen them making their way towards it from the adjacent meadows; have chased them on it, and procured from between the fissures numbers of the parchment-like envelopes of their eggs after the young had been hatched. It is very probable that occasionally an incautious snake lost its life by falling into the mouth of the kiln among the burning lime. White, in his 'History of Selborne,' complains that snakes lay chains of eggs every summer in his melon-beds, in spite of all that can be done to prevent them: the eggs, he adds, do not hatch till the spring following; hence it follows that where they are not laid in such places as manure heaps, or in the crevices of limekilns, as above noticed, and so subjected to what may be termed artificial heat regularly kept up, they have to undergo the natural cold of our winter. In all cases most probably they are so secured as to be defended against severe frost. Mr. Bell merely states that the snake deposits its eggs a considerable time before the young ones are hatched, leaving them to be vivified and developed by the heat of the sun or a dung-heap. The eggs are invested with a membrane, and are eighteen or twenty in number, connected together, by a glutinous matter, in a long string or chain.

The snake swims well and very gracefully, with the head arched above the surface, and, as we have witnessed, it can remain a considerable time below. It is probable that snakes pursue frogs and water-shrews in this element; but they also delight in it, for we have watched them swimming about without any apparent object beyond the pleasure of the bath; we have also known them take to the water in order to escape when chased: on one occasion we suddenly surprised a large dark-coloured female basking on the edge of a large pond or sheet of water in Cheshire; on endeavouring to seize her, she plunged instantaneously into it, and swam directly across to the opposite side, where the bank was high and precipitous, and there entered a hole, apparently the burrow of a water-rat. In this fondness for water the snake differs from the blindworm, which avoids it, and from the viper, which prefers dry localities, seldom if ever voluntarily attempting to swim.

The snake is very voracious, and pursues its prey with great determination. It feeds on mice, nestling birds, and frogs, especially the latter, of which it is a great destroyer. We have several times seen snakes in the act of swallowing a frog, their jaws forced asunder, their neck swollen, and so absorbed in their laborious efforts to engulf their prey, all the while alive, that they have made no attempt to escape. In taking the frog, the snake generally seizes one of the hind-legs, and first draws it in, then the whole body, portion after portion, till the whole disappears. This indrawing of the prey is not an act of simple suction, but is connected with the mechanism of the jaws, of which the bones are distinct, being united together and to the cranium only by elastic ligaments. This plan ensures the necessary dilation of the mouth, for the prey swallowed generally exceeds the circumference of the snake; and next, allows the opposite side of each jaw, above and below, the power of independent motion: the upper jaw on each side has two rows of sharp teeth; the lower jaw has one row. The process is as follows:—The frog being seized, the snake advances as far as possible the corresponding branches of the upper and lower jaw of one side, fixing the teeth into the skin of the victim; this done, and a secure hold taken, it advances the branches of the opposite side, and so on alternately till the whole is gradually forced into the gullet, stretched almost to bursting. The poor frog is swallowed alive, and has been distinctly heard to utter its peculiar cry of distress some minutes after having been swallowed: this piteous cry it utters when chased by the snake, of which it has an instinctive terror; when fairly seized, however, it gives itself up to its fate, and seldom attempts to struggle. Mr. Bell relates a curious circumstance of two snakes seizing one the hind-leg, the other the fore-leg of the same frog, and continuing their inroads upon the victim till their upper jaws met, and they bit each other in turn. After one or two such accidents, the most powerful of the snakes commenced shaking the other, which still had hold of the frog, with great violence from side to side. In a short time the other returned the attack, and this was repeated till the one which had the slightest hold was regularly shaken off, when the victor swallowed his prey in quiet. The contest being over, a frog given to the unsuccessful combatant was immediately seized and swallowed. In taking birds, lizards, &c., the snake swallows them head foremost. After gorging its food it becomes lethargic, and continues in a state of inaction till the whole is digested, when it seeks a fresh supply.

[To be continued.]

MARSHES.

MARSHES are those places, of greater or less extent on the earth's surface, where the soil is almost constantly soaked with water. The swamp, the bog, the fen, and the morass, are so many different names for the same thing, or modifications which have not yet been defined. Whether marshes be considered with regard to their advantages or disadvantages, they are equally interesting, and are objects that call for the attention of individuals and sometimes of states. The advantages which they offer are of limited extent, and may be divided into spontaneous and artificial. The former consist in the natural productions which are furnished by some of them, of which peat is unquestionably the most important. Some furnish iron-ore in considerable quantity, and, though generally of a bad kind, it is sometimes very good, and worked with advantage, as in Siberia; others supply aquatic game in abundance, which is a great resource to the neighbouring inhabitants, either for consumption or as an article of commerce (the marshes of Tuscany); others again abound in eels and other fish; and some, as those of the Saône in France, and those of Poland, are valuable for the myriads of leeches which they furnish, and which are sent to distant parts. The soil itself, dug up from the marshes, which is called bog-earth, and the upper surface of the peat-bogs, burnt or unburnt, are in many cases considered an excellent manure, and employed as such. The reeds, rushes, willows, &c., which grow so abundantly in certain marshy lands, are in many places objects of considerable importance. The artificial advantages to which marshes may be turned are confined chiefly to the cultivation of rice, where climate and other circumstances are favourable to the growth of this grain. The disadvantages of marshes are great: they are in general fatal to health, and agriculture suffers by the loss of all the marshy land. That health is materially injured by the pesti-

lential air of marshes is evident from the fact that the ordinary mean length of life in their neighbourhood is very low. Cattle are also great sufferers from the influence of marshy grounds. The engineer Rauch says, "Marshes are the ulcers of the earth, which blur the fair face of nature, where all should be beauty; and from these infectious sores the languor of death extends far and wide over all that should live and flourish:" but the details of their baleful influence are nowhere more strikingly set forth than in the prize essay on this subject, by M. Ramel of Paris. Nevertheless all marshes are not equally prejudicial to health; but independent of their different degrees of insalubrity, marshes present other distinguishing features. The climate, the nature of the soil, and the vegetation, are all so many circumstances which vary the appearance and character of marshes. The quantity of water is also very different; in some cases it is hardly visible, while in others, at least in certain seasons, the marsh presents the aspect of a multitude of stagnant pools covered with aquatic birds. This is the case with many of the Tuscan marshes, which are moreover remarkable for their floating islands, which sometimes unite and cover a large surface: these islands have little solidity, and, eventually sinking, become in time converted into peat: some of these marshes gain in extent, while the soil of others gradually rises, and the marsh disappears. Reeds are particularly abundant in the Tuscan marshes, and they are applied to a great number of useful purposes. The quality of the marsh-water also differs: thus, in some of the marshes of South Carolina, in the United States, it is salt, as likewise at Rochelle, Rochfort, &c. in France. In other places it is sulphureous, as is the case with the marshes of Mesopotamia: in many it is ferruginous, as in Siberia, where the marshes are strongly impregnated with sulphate of iron from the vitriolic springs which flow into them. The trees which are found imbedded in these marshes are so thoroughly impregnated with oxide of iron, that they supply an ore of excellent quality, furnishing a metal free from the defect of brittleness so common to the iron of most other bog-ores. In some cases the water of the marsh exhales an intolerable smell of sulphuretted hydrogen, arising from the decomposition of the sulphate of magnesia, or Epsom salt, which is continually forming on their banks.

In cold countries, marshes freeze, but seldom become dry; in warm countries, on the contrary, the marshes are often dry, and such can never form peat. As to the vegetation of marshes, it is either composed of reeds, rushes, algæ, gramineæ, or mosses, of which the *sphagnum palustre* is the most common in peat-bogs. Brushwood, of various kinds, and willows and alders, are also common in marshy grounds. Marshes are found in all kinds of situations; in continents and in islands—on the margin of the sea, as well as in the interior of the land—on the slopes and even on the summits of mountains, as well as in the plains. Most countries have them in greater or less abundance, but it has been remarked that they are less common in Asia and in Africa (as far as the latter is known) than in Europe, and that they are more abundant in America than elsewhere. In this latter part of the world almost all the plains are wet and abound in marshes; they are exceedingly common in the northern countries of the globe, particularly in the flat parts bordering on the sea, where the land is low and the subsoil clay. Here the rain and snow-water accumulate, and remain for want of sufficient evaporation to carry them off.

It would be impossible to enumerate all the existing marshes: we may, however, observe that in Italy there are the Tuscan and the celebrated Pontine marshes, which are of great extent; in France there are about 1,500,000 arpens, or French acres, of marshes, some of great surface, as that of Montoire near the mouth of the Loire, which has been worked for its peat for upwards of five hundred years, and gives constant employment to eight thousand persons. Ireland contains about three million acres of marsh; the marsh or bog of Allen alone contains three hundred thousand acres, and there are others very extensive. England has many marshes, particularly in Lincolnshire, Somersetshire, Kent, and Cambridgeshire; Chester, Huntingdonshire, Lancashire, and Stafford have extensive marshes, some of which contain embedded trees. Scotland is much diversified with marshy ground, as in Peebleshire, Ayrshire, Stirlingshire, Kinross, &c. As for Holland, the whole country is properly a drained marsh, and it still contains some extensive bogs which furnish peat. All the space along the coast from Holland to Denmark is little better than a succession of marsh and sand. Russia in Europe has marshes of vast extent, as those at the source of the Don, along the river Pripitz, and round the sea of Azoff, as also in Finland and the Baltic Provinces, in Lithuania and Poland. The eastern part of Prussia abounds in swamps. Norway and Sweden have some bogs, but little in proportion to their territory. In Bessarabia, in Turkey, and all along the lower Danube, there are extensive marshes covered with reeds. In Hungary the marshes are estimated at two million arpens. Switzerland has some considerable swampy patches, many of which are on the slopes of the mountains and in the higher valleys. In Spain and Portugal there are some extensive marshes; indeed, they are more or less scattered all over Europe.

Asia has its marshes and swamps, but they are less common than in Europe, if we except the northern portion, where they are in great number and very extensive, as between the lower Ob and the Yeniseï, and between this last river and the Lena. There is between the little Tanguska and the Yeniseï the marsh called Lis, equal in extent to the great lake Ladoga suspended as it were in the midst of rocky hills. The province of Okhotsk has many swampy forests. A large part of China is naturally swampy, but it is to a great extent drained by the numerous canals which intersect the country. Tonquin has many marshes, and the peninsula of Malacca contains many of great extent. In India the province of Oude has some extensive marshes covered with reeds, the retreat of great herds of wild buffaloes. The mouths of the greater part of the rivers of India are marshy, and large swamps are sometimes found along their course, as is the case with the Padder. In the northern provinces there are many savannahs, or wet meadows. There are swamps along the Euphrates, and those of Mesopotamia are bitter, sulphureous, and salt. In Persia the province of Ghilan, in other respects fertile and beautiful, is very unwholesome on account of its marshes and marshy forests. Mazenderan has also many swamps. The eastern side of the lake Aral is marshy. The steppes of the Kirghis abound in salt marshes and pools. The Asiatic islands, that is, all those that are of any extent, contain marshes: thus part of the coast of Sumatra is covered with extensive marshes, which have caused it to receive the name of "the pestiferous coast;" the reeds are gigantic bamboos, and a continual fog hangs over the aquatic soil. Batavia, Samarang, and other places in the island of Java are reputed to be so unwholesome, in consequence of the stagnant waters and pestilential marshes, that the island has been named the grave of Europeans. The Philippine Islands have a great many peat-bogs. New Holland has much marshy ground along the coast, and immense swamps have been seen inland

As for Africa, its interior is too little known to

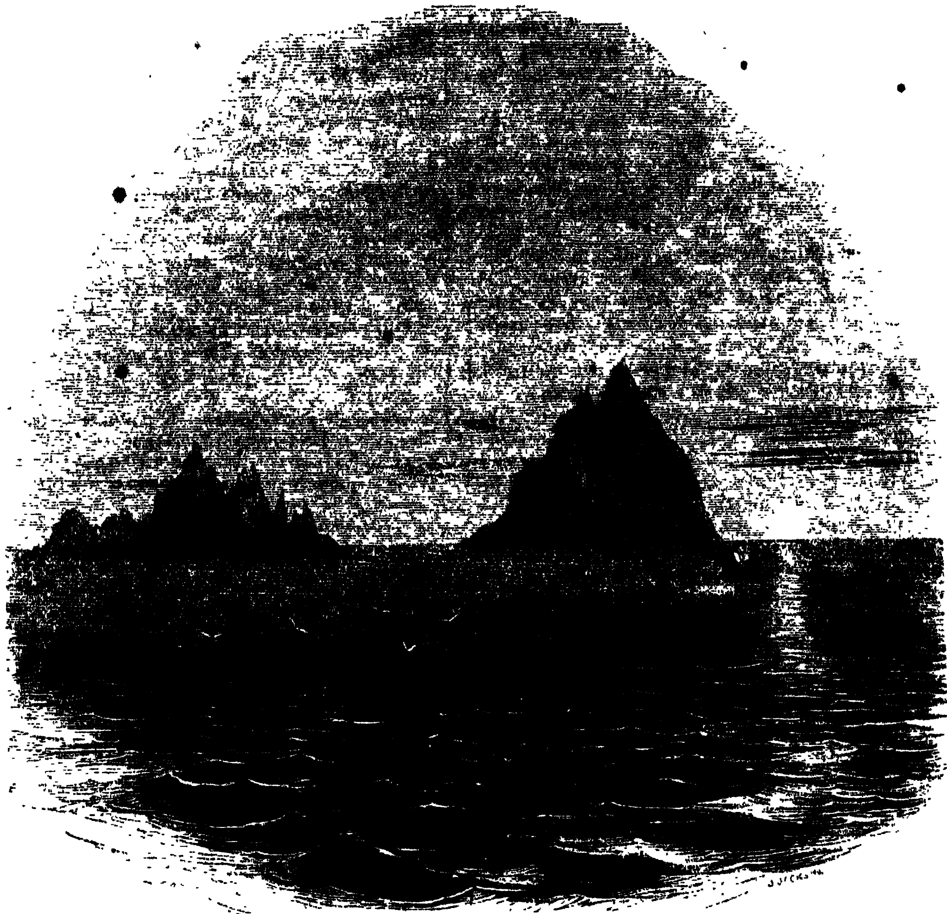
enable us to speak with any certainty of its marshes; but the southern part, according to Barrow, has many and extensive swamps covered with reeds and saline plants. Some of the rivers on the east are marshy at their embouchures, which is also the case with the Quorra. Madagascar contains marshes, in which the singular Ravenala (*urania speciosa*), a kind of palm, grows, remarkable for the size and disposition of its leaves, which are similar to those of the banana, and are employed by the natives as table-cloths, napkins, plates, dishes, and spoons.

America contains immense marshes. In the frigid zone of the New World, as far as known, fog-enveloped marshes have been found. To the westward, in Russian America, the land lying between the coast and the mountains is a slip of black swampy soil; some of the marshy grounds are on the slopes of the mountains, and retain the water like a sponge; their verdure (being covered with moss of various kinds) gives them the appearance of firm land, but in endeavouring to pass them the traveller sinks up to the waist. On the opposite or east coast of America we find Newfoundland intersected by marshes and morasses. Lower Canada has neither marshes nor stagnant water, but the rivers are muddy. To the south of the great lakes of North America, and as far south as Mexico, the United States contain a great number of marshes, and some of them of great extent. The low lands of Mexico also contain many swamps. The former intendencia of Vera Cruz is principally occupied with marshes and sands. South America contains a great abundance of extensive marshes, as on the upper Apure, an affluent of the Orinoco; and the delta of the latter river is one vast swamp. The region which extends between the Andes and the Pacific has little marshy ground, if we except Chaco, where there are many swampy valleys; but, on the other hand, the immense plains which occupy the whole interior of the continent, from the mountains of Caracas on the north to the Straits of Magalhaens on the south, contain a great number of extensive marshes. All the immense basin of the Amazon is covered with swamps and wet land, and marshy forests. To the south of the Campos Paroxis, the provinces of Moxos and Chiquitos contain extensive marshes; in the latter particularly there is the great lake or marsh of Xarayes. This marsh is temporary, however, being dry a great part of the year, and then covered with the corn-flag (*gladiolus*) and other *irideæ*. The province of Chaco is also full of marshes, as well as that of Cordova, in which are the swamp of Los Porongos, the Mar-chiquito, &c. In La Plata there is the great marsh of Ybera, formed by the infiltrations of the Parana. At the north-west extremity of the Pampa of Buenos Ayres is the great reedy marsh called Los Canaverales, and along the whole course of the Rio Mendoza, and between that river and the foot of the Cordilleras there are extensive marshes. They also exist on the upper part of Rio Negro. In short, we may say that all the immense region of the Pampas, or plains of South America, contains marshes. Brazil has many swampy woods; and in ascending the coast we find the great island of Marajo at the embouchure of the Amazons, a considerable tract of which is a marsh, formed in part by the deposit from the water of the river, and in part by the sands of the sea. Farther north again the whole coast of French Guyana is a swamp.

This enumeration of the known marshes and swamps, though comprehensive, is, however, far from being complete. Very large portions of the earth's surface remain still unexplored, and physical geography is yet too modern a science to have attracted the attention of travellers to the correction and completion of its details. Nevertheless it is certain that the extent of marshy ground is very great; and probably it was formerly much greater, for a multitude of natural circumstances have greatly diminished them, and are still effacing them by degrees. On the other hand, colonization, and the consequent increase of population in the newly settled places, cause the clearing of forests and the draining of marshes to go on rapidly. There is no doubt but that in proportion as the swamps are dried up the source of many diseases will be got rid of; but again, it may be doubtful whether the increased drought occasioned by so vast a reduction of evaporating surface may not engender other diseases equally fatal with those which now spring from the superabundance of swampy ground; and it is possible that even absolute sterility may result, in some cases, from imprudent drainage.—*From the Penny Cyclopædia.*

Rome in the Sixth Century.—It was towards the close of this interval that Belisarius felt a desire to visit and survey with his own eyes the ruins of a place that had been the theatre of so much grandeur and renown; and with this view he sallied forth from the sea-port at the head of a strong squadron of his guards. A marble wilderness extended on every side as far as the eye could reach, strewed with the ruins of Vitruvian villas, temples, and aqueducts: the waste water of the latter had filled all the valleys and overflowed the low grounds of the Campagna, converting into marshes and mantling pools those regions which erewhile had abounded with all the delights of the Hesperides. The thoroughfares of the nations were silent and lonely as the double line of tombs through which they passed. The towers and inscriptions over the gates had been torn down, and their bronze portal carried off in the plunder-train of the barbarian. The rock-built walls of Rome lay low; and the tramp of their war-horses was muffled by the grass, as Belisarius and his troops rode under a succession of dismantled arches, down towards the Forum, along the "Sacred Way." The fox looked out from the casements of the Palatine, and barked sharply at the intruders as they rode on, wolves prowled through the vacant streets, or littered in the palace halls; wild dogs hunted in packs, through the great circus, through the baths, along the Campus Martius, and on to the gardens of Sallust and Mæcenas, through the promenades of the Suburra. Outlandish beasts—as if escaped from the menageries and keeps of the amphitheatres—lay sleeping and enjoying themselves in the sunshine of the porticoes, or tore one another to pieces, as the factions had done of old, around the rostrum and in the assembly-place of the people; others growled and snarled, and gloated over the unburied carcasses and whitening skeletons of the dead. Ravens and vultures desisted from feeding their sanguinary nestlings to hoot the warriors as they wound slowly among the prostrate columns and entablatures of temples that encumbered the ascent to the Capitol, or, starting from their perching-places on trophy and triumphal arch, hovered and flapped their sable wings above the plumage of their helmets. Once more the Roman eagle soars above the Tarpeian tower—that eyry from whence, for a thousand years, it had flown forth to carnage; and the martial bugle makes the field of Mars resound again. But instead of the warlike response of legions—clamouring to be led against the Samnite or the Parthian—there broke out a hideous medley of yells and howling, yelp, bark, and roar, outtopped by the shrill cries of ill-omened birds startled from their roosts in the sanctuary recesses, and from the niches and cornices of the Senate-house. The warriors listened for some human sound. In vain they listened, and listened again. There was the Palatine, the Forum, the Capitol, the Campus Martius, and the Tiber flowing under the beauteous summer-sky beneath the Tarpeian cliff; but the Legions, the Emperors, the Senate, and the Roman People, where were they?—*Rome as it was under Paganism, and as it became under the Popes.*

Education in Iceland.—In the island of Iceland there is no such thing to be found as a man or woman—not decidedly deficient in mental capacity—who cannot read and write well, while the greater part of all classes of the inhabitants have mastered several of the higher branches of education, including a knowledge of modern languages and an acquaintance with classical literature.—*Porter's Progress of the Nation,* vol. iii., sec. vii., *Moral Progress.*



[The Skelligs.—From an original Sketch.]

THE SKELLIGS.

The Great Skellig is probably one of the most extraordinary objects which the love and research for sublimity and adventure has still left amongst the lesser known of British Islands.

It rises out of the Atlantic a mighty pinnacle, nearly a thousand feet high, as sharp as an Alpine aiguille, and as elegant and beautiful in form as can well be conceived. It stands about ten miles out to sea, off the south-west coast of Kerry, sufficiently far out in the Atlantic to encounter its waves in their wildest mood, before they have been checked by the shallows and other influences which waves usually experience before they finally break upon a line of shore. It is the extreme western piece of British land. The accompanying sketch was taken on approaching it, and its sister isle, the Lesser Skellig, when at a distance of about three miles. Upon a near approach it seems hardly possible to find footing on its steep and riven sides. The landing is at all times difficult and uncertain, and, indeed, except in very calm weather, quite impracticable. The first impression on touching the base of this lofty pyramid, rising so grandly out of the world of waters, is impressive. The solitary and fearful grandeur of this mighty rock, lifting itself up in naked majesty, as if the peak of some vast submarine mountain, cannot but penetrate every mind with a feeling of deep sublimity. It is a schistose rock, the strata nearly vertical. Amongst the crevices there is a small but luxuriant vegetation. A spinach grows wild, of a particularly pleasant flavour when cooked. The sea-plantain is also luxuriant, and the common navelwort. Even this spot has had its inhabitants. About one-third up, on a little platform, there is a cluster of domed cells, or "kills," built and inhabited by monks so early, according to Geraldus Cambrensis, as the sixth century. The Annals of Innisfallen mention an abbot of Skellig who died in 885. The rugged nature of the place, though no doubt the original inducement to the settlement, afterwards occasioned its abandonment, and it is believed that the cells have not been regularly inhabited since the ninth century. These curious specimens of architecture, built precisely in the shape of an ordinary bee-hive, are probably as perfect now as when they were built. The stone exhibits no sign of disintegration, nor is any appearance of settlement or alteration of structure to be traced. They were evidently constructed, without mortar, of rough slaty stones of a very imperishable nature, and so laid together as to exclude both wind and rain. In later centuries pilgrimages by penitents to these cells have not been unfrequent. The greatest penance consists in climbing to the very top of the Peak, called the Spit, which, to look at it from below, one would think could never be attempted. Its first inhabitants were not improbably amongst the most enlightened of the dark ages, its inhabitants now are enlighteners not of moral and mental, but of physical darkness. For ages this coast had proved the grave of thousands, and the wrecks which annually strewed its shores, forming in great part the wealth of its inhabitants, called loudly for some beacon to warn the mariner. The Trinity Board of Ireland, in the year 1826, at enormous cost, erected

two lighthouses on the west side of the Peak. Two light-keepers and their families now live upon the rock; one of these had not been ashore, as he expressed it, for five years, several of his children never. These lights are the first seen by vessels coming across the Atlantic. The light-keepers state that they never have frost, and that snow rarely falls and never lies, and their oil never thickens. The temperature of this whole coast is singularly mild and equable, the thermometer, it appears, having never been lower for several years than 28° Fahrenheit nor higher than 73°.* This mildness may be owing to the influence of a branch from the Gulf-Stream, which appears to set upon this coast. The light-keepers are supplied with provisions by boats from the harbour of Valencia, thirty-six miles from Killarney. Often, especially in winter, they are long without any communication. Any one wishing to see the Skelligs may get a boat at Valencia, but it would be necessary to wait for a fit day; there is, however, fine coast scenery, and several objects of interest in the neighbourhood, on which a few days might be well spent, and there is a comfortable little hotel withal on the island of Valencia. To be on the Skellig during one of those tremendous storms which visit this coast would be one of the finest things imaginable. To witness the breaking and foaming of the Atlantic waves after rolling and gathering strength for thousands of miles over a deep sea, charging the base of the pyramid with a fury inconceivable, dashing their spray several hundred feet high, would be enough to satisfy the deepest longings for the terrible and sublime.

During these storms the light-keepers affirm that it is dangerous to stand at a lower level than a hundred and seventy feet above the sea. A smith's anvil of great weight was washed away at a height of a hundred and fifty feet during the erection of the buildings. The Lesser Skellig is known to naturalists as one of the six breeding-stations of the Gannet, or Solan Goose. These birds are never known to touch on the Greater Skellig, nor on any part of the coast, confining themselves exclusively to their own territory. The plumage of the adult bird is of a peculiarly brilliant white, the points of the wings being black. The sharp pointed rocks of this island render it more difficult to effect a landing here, and it has never been inhabited.

AMERICA DISCOVERED IN THE TENTH CENTURY.

It has been stated that the earliest claim to the honour of discovering this interesting portion of the globe is that which has been given by Snorro Sturlonides, in his 'Chronicle of Olaus,' published at Stockholm in 1697. He states that those enterprising navigators, the Norwegians, planted a colony in Iceland as early as the year 874, and established some settlers on the coast of Greenland in 982, when they are represented as having proceeded towards the west, and, finding a more inviting coast, on which were some grape-vines, and in the interior some pleasant valleys shaded with wood, they gave it the name of *Vinland*, and settled some colonists there.

This statement has been considered as founded on rumours, and so much involved in the obscurity of the past, as to render the authenticity of the facts extremely doubtful. But the publication, in 1838, of the work entitled 'Antiquitates Americanæ,' by the Royal Society of Northern Antiquaries at Copenhagen, wherein Professor C. C. Rafn has given in Danish, with a Latin translation, the contents of many of the old Gothic MSS. preserved in the archives of Denmark, has put the matter beyond a doubt.

This great work presents a host of striking facts which prove beyond a doubt that America was discovered by the Northmen in the year 986, and was repeatedly visited by them during the two succeeding centuries. The nautical and astronomical notices, preserved in some of the ancient writings, are of the greatest importance in fixing the positions and latitudes of the places named. The identity of Vineland with Massachusetts and Rhode Island is fully established.

It appears from the narratives in this interesting work (of which a detailed abstract was given in the 'Journal of the Royal Geographical Society,' whence the following sketch is taken), that, in the spring of A.D. 986, Eric the Red, with his household, in which, amongst others, were his three sons, Leif, Thorwald, and Thorstein, and also a natural daughter named Freydisa, emigrated from Iceland to Greenland, where they formed a settlement. Among those who accompanied him was Heriulf Bardson, whose son Biarne happened at this time to be on a trading voyage to Norway. Eric established himself at Brattahlid in Ericsfiord, and Heriulf Bardson settled at Heriulfsnes.

When Biarne returned to Eyrar in Iceland, and found that his father had departed, he determined upon spending the following winter with him, as he had done the preceding ones, although he and all his people were entirely ignorant of the navigation of the Greenland Sea. To this determination the original discovery of America appears to be owing.

They commenced their voyage; fogs and northerly winds arose, and for many days they were driven they knew not whither. At length they descried a land without mountains, overgrown with wood, and presenting many gentle elevations; but as it did not correspond with the description which they had received of Greenland, they left it to the larboard, and pursued their course for two days, when they came to another land, which was flat and overgrown with wood. They again stood out to sea, and, after three days' sailing with a south-west wind, perceived a third land, which Biarne discovered to be an island; but as it did not present an inviting aspect, being mountainous and covered with glaciers, he did not go on shore, but bore away with the same wind, and, after four days' sailing, arrived at Heriulfsnes in Greenland. This was in the summer of 986.

About eight years after this Biarne went on a visit to Eric, Earl of Norway, and related to him his voyage, with an account of the strange lands he had discovered. Biarne's description of the coasts was very accurate, but he was much blamed for not having made himself better acquainted with the country.

In Greenland his voyage had excited much interest, and, on his return, a voyage of discovery was projected.

Among those whose curiosity had been excited by the discovery of the unknown lands, was Leif, one of the sons of Eric the Red. This enterprising navigator purchased Biarne's ship, and, having manned it with a crew of thirty-five men, set sail in quest of strange lands, in the year 1000. The first land they made was that which Biarne had seen last. Here they went on shore; not a blade of grass was to be seen, but everywhere mountains of ice, and between these and the shore one barren plain of slate (hella). This country not appearing to possess any good qualities, they called it Helluland, and put to sea again. This was the land which Biarne had discovered to be an island, and was doubtless Newfoundland, which in modern descriptions is said partly to consist of naked rocky flats where not even a shrub can grow, and therefore called Barrens; thus corresponding to the island of Helluland first discovered by Biarne. The next land they came to, and where they went on shore, was level, covered with woods, and characterized by cliffs of white

sand and a low coast: they called it Markland (Woodland). This country, south-west of Helluland, and distant from it about three days' sail, is Nova Scotia, of which the descriptions given by later writers answers completely to that given by the ancient Northmen of Markland. Leif left this country, and, after two days' sailing with a north-east wind, came to an island eastward of the mainland. They sailed westward, and went on shore at a place where a river issued from a lake and flowed into the sea. Here they first raised some log-huts, but when they had determined upon passing the winter there, they built commodious houses, which were afterwards called Leifsbudir (Leif's booths). Leif then divided his people into two companies, which were alternately to be employed in guarding the houses and in making short excursions. He gave them special instructions not to go farther than would admit of their return on the same evening. It happened one day that one of his followers, a German named Tyrker, was missing. Leif, with a small party, went out to seek him, but they soon met him returning. He informed them that he had not been far, but had discovered vines and grapes, with which he was well acquainted, having been born in a country where vines grew. They had now two employments—hewing of timber for loading the ship, and collecting grapes, with which they filled the long-boat. Leif named the country Vinland (Vineland), and in the spring departed thence for Greenland.

The country thus named Vineland, and which is proved to be identical with Massachusetts and Rhode Island, naturally became the theme of much conversation in Greenland; and Leif's brother, Thorwald, thinking it had not been sufficiently explored, was desirous of making a voyage thither, with a view to more extensive researches. In pursuance of this object he borrowed Leif's ship, and, having received his instructions and advice, set sail in the year 1002. They reached Vineland at Leif's booths, and spent the winter there. In the spring of 1003 Thorwald equipped the ship's long-boat with a party of his followers for the purpose of making a voyage of discovery southwards. They found the country extremely beautiful, but without any appearance of men having been there before them, except on an island to the westward, where they discovered a wooden shed. They did not return to their companions at Leifsbooths until autumn.

In the summer of 1004 Thorwald left a party at Leifsbooths, and steering his course first eastward and then northward, passed a remarkable headland enclosing a bay. They called it Kialarnes (Keelcape) from its resemblance to the keel of their ship. This promontory, which modern geographers have sometimes likened to a horn and sometimes to a sickle, is Cape Cod. They sailed along the eastern coast into one of the nearest firths, until they arrived at a promontory entirely overgrown with wood, where they all landed. Thorwald was so much pleased with this spot, that he exclaimed to his companions, "Here it is beautiful, and here I should like well to fix my dwelling." He little thought that, instead of being his dwelling, it was so soon to be his burial-place. As they were preparing to go on board, they descried on the sandy beach three hillocks, which, on a near approach, were found to be three canoes, and under each three Skrellings (Esquimaux). A fight ensued: eight of the Skrellings were killed; the ninth escaped with his canoe. Afterwards a numerous party rushed upon them from the interior of the bay, and discharged arrows at them. Thorwald and his party endeavoured to shield themselves by raising little screens on the ship's side, and the Skrellings at length retired, but not till Thorwald had received a wound under the arm from an arrow. Finding the wound to be mortal, he said to his followers, "I now advise you to prepare for your departure as soon as possible, but me ye shall bring to the promontory where I thought it good to dwell; it may be that it was a prophetic word which fell from my mouth about my abiding there for a season: there shall ye bury me, and plant a cross at my head and also at my feet, and call the place Krossanes (Crossness) in all time coming." He died, and they buried him as he had directed. (Krossanes is, in all probability, Gurnet Point.) After this they rejoined their companions at Leifsbooths, where they spent the winter; but in the spring of 1005 set sail for Greenland to communicate to Leif the fate of his brother.

When the circumstance of the death and burial of Thorwald was made known in Greenland, Thorstein, Eric's third son, determined on making a voyage to Vineland to fetch his brother's body. He equipped the same ship, and was accompanied by his wife Gudrida: but his design was frustrated; for, after having been tossed about and driven they knew not whither during the whole summer, they landed in the western settlements of Greenland, where Thorstein shortly after died. In the spring Gudrida returned to Ericsfiord.

This unsuccessful expedition was soon after followed by another, on a larger scale than any of the preceding ones; for it happened that, in the summer of 1006, two ships arrived from Iceland, the one commanded by Thorfinn Karlsefne, a wealthy and powerful man, of illustrious birth; the other by Biarne Grimolfson. Thorfinn was accompanied by Snorre Thorbradson, and Biarne by Thorhall Gamlason. At this time a festival was held at Brattalid, on which occasion the Vineland voyage was the leading topic of conversation, and Thorfinn, being captivated by Gudrida, asked and obtained the consent of her brother-in-law, Leif, to their union, which took place in the course of the winter. On the celebration of these nuptials the Vineland voyage was again the subject of discussion, and Karlsefne was prevailed on, by his wife Gudrida and others, to prosecute a voyage thither and plant a colony. Accordingly three ships were fitted out, and all kinds of live-stock taken on board. The first ship was commanded by Thorfinn Karlsefne and Snorre Thorbradson, the second by Biarne Grimolfson and Thorhall Gamlason, and the third by Thorward, who had married Freydisa, the natural daughter of Eric the Red. They mustered one hundred and sixty men, and, being furnished with what was necessary for the occasion, departed in the spring of 1007. After touching at Helluland and Markland, they came to Kialarnes (the Nauset of the Indians), where the trackless deserts, long beaches, and sands so much excited their wonder, that they called them Furdustrandir (Wonder Strands). They passed these, and came to a firth which ran far into the country, and which they called Straumfiördr (Stream firth). On the shore of this firth they landed: the country was beautiful, and they made preparations for a winter residence; but Thorhall wished to go in quest of Vineland in a north direction. Karlsefne, however, decided on going to the south-west. Thorhall, therefore, with eight men, quitted them, and was driven by westerly gales to the coast of Ireland, where, according to some accounts, they were taken and made slaves. Karlsefne and those that remained with him, in all one hundred and fifty-one men, sailed in a southerly direction till they entered a river which fell into the sea from a lake. They steered into this lake, and called the place Hóp, which, in Icelandic, signifies a bay, or the land bordering on such a bay. Here they landed, and found wheat growing wild on the low grounds, and on the rising lands grape-vines. To this place Mount Hope's Bay corresponds; and it was at this Hóp that Leifsbooths were situated. Above this, and most probably

on the beautifully situated elevation afterwards called by the Indians Mont Haup, Karlsefne and his companions erected their dwellings and passed the winter. They had no snow, and the cattle fed in the open fields. One morning, in the beginning of 1008, they perceived a number of canoes coming from the south-west past the cape. Karlsefne exhibited friendly signals by holding up a white shield, and the natives, a sallow-coloured and ill-looking* race, drew nigh, and commenced bartering furs and squirrel-skins for pieces of red cloth, and afterwards for milk-soup.

Whilst this traffic was proceeding, a bull, which Thorfinn had brought with him, came out of the wood and bellowed loudly. This terrified the Skrellings, they rushed to their canoes, and rowed away. About this time Gudrida gave birth to a son, who received the name of Snorre. At the commencement of the following winter the Skrellings appeared again in much greater numbers, and menaced hostility by loud yellings. They advanced—a battle took place: the Skrellings had war-slings, and a galling discharge of missiles fell upon the land, one, enormously large, fell with a crash that filled the Northmen with dismay, and they fled into the woods. Freydisa, the wife of Thorward, a bold and artful woman, upon perceiving the retreat of her countrymen, called to them, and reproached them with their cowardice, saying, if she had a weapon she would defend herself better than any of them. She followed them, as quickly as the advanced state of her pregnancy would admit of, into the wood, where she saw the dead body of Snorre Thorbrandson, a flat stone was sticking in his head, and his drawn sword was lying by his side. This she seized, and by her frantic gestures so terrified the Skrellings, that they in turn fled to their canoes and rowed away. Thorfinn and his people now rallied, they came up to her and praised her courage: but they become convinced that they could not continue in the country without being in constant alarm from the powerful hostility of the natives, and therefore determined upon returning to their own country. They freighted their ships, sailed eastward and came to Straumfiord, where they passed the third winter, Karlsefne's son Snorre being then three years old.

At Markland they met with five Skrellings, two of which (boys) they caught and carried away with them. These children, after they had been taught the Norse language, informed them that the Skrellings were ruled by chieftains (kings), that there were no houses in the country, but that the people dwelled in holes and caves. Karlsefne, after having gone in quest of Thorhall, pursued his voyage to Greenland, and arrived at Ericsfiord in 1011.

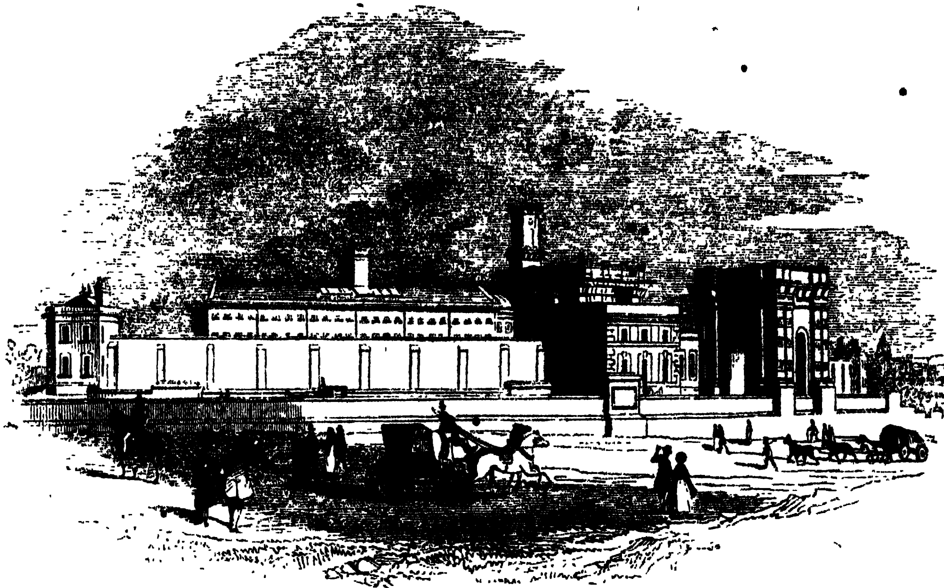
The next voyage was undertaken at the instigation of the artful Freydisa, who prevailed on two brothers, commanders of a ship from Iceland, to make a voyage to Vineland, and share equally with her in all the profits. To this the brothers, Helge and Finnboge, assented, and a mutual agreement was entered into that each party should have thirty-five able-bodied men on board their ship; but Freydisa concealed five additional men, whom she took with her. They reached Leifsbooths in 1012, where they remained during the winter. But the deceitful conduct of Freydisa caused an estrangement between the parties, and she at length succeeded, by subtlety and artifice, in persuading her husband to effect the murder of the two brothers and their followers. After this atrocious act they returned to Greenland in the spring of 1013.

At this time Thorfinn Karlsefne was waiting for a fair wind to sail for Norway. His ship was laden with a more valuable cargo than was ever before known to leave Greenland. When the wind was favourable, he sailed to Norway, and sold his goods. The next year he proceeded to Iceland, and in the year following, 1016, purchased the Glaumboe estate, where he resided during the remainder of his life. Snorre, his American-born son, also dwelled and ended his days there.

Among the numerous and illustrious descendants of Karlsefne was the learned bishop Thorlak Runolfson, born in 1085, of Snorre's daughter Halfrida, who was probably the original compiler of the account of the foregoing voyages. After these many voyages were undertaken, and the last piece of information preserved in the ancient MSS. relates to a voyage, in the year 1347, from Greenland to Markland, undertaken for the purpose of bringing home timber and other supplies. On her voyage homeward the ship was driven out of her course, and arrived, with loss of anchors, at Straumfiord, in the west of Iceland. From the accounts of this voyage, written by a contemporary nine years after the event, it appears that the intercourse between Greenland and America Proper had been maintained to so late a date as 1347; for it is expressly stated that the ship went to Markland, which must have been thus mentioned as a country still known and visited in those days.

Thus it appears that, during the tenth and eleventh centuries, the ancient Northmen discovered a great extent of the eastern coasts of North America, and made frequent visits to Massachusetts and Rhode Island; and that, during the centuries immediately following, the intercourse was never entirely broken off. As confirmatory of these statements, Dr. J. V. C. Smith, of Boston, has since sent an account of a remarkable rough stone cemetery, discovered about fifty years ago in Rainford Island, in the bay of Boston, which contained a skeleton and a sword-hilt of iron. Dr. Smith argues that, as the body could not have been that of a native Indian nor of a settler posterior to the re-discovery, it was most probably that of one of the early Scandinavians. Dr. Webb, of Providence, has also furnished an account of a skeleton found near Troy, Massachusetts, on or near which were a bronze breast-plate, bronze tubes belonging to a belt, &c., none of which appear to be of Indian or of a comparatively modern European manufacture.

Shooting Rapids on the Coppermine.—From Sir John Franklin's description of the lower part of the Coppermine, we anticipated a fray of dangers and excitement, nor were we disappointed. Franklin made his descent on the 1[illegible]th of July, when the river had fallen to its summer level; but we were swept down by the spring flood now at its very height. The swollen and tumultuous stream was still strewed with loose ice. The day was bright and lovely as we shot down rapid after rapid, in many of which we had to pull for our lives, to keep out of the suction of the precipice, along whose base the breakers raged and foamed with overwhelming fury. Shortly before noon we came in sight of Escape Rapid of Franklin, and a glance at the overhanging cliffs told us that there was no alternative but to run down with full cargo. In an instant we were in the vortex; and, before we were aware, my boat was borne towards an isolated rock, which the boiling surge almost concealed. To clear it on the outside was no longer possible; our only chance of safety was to run between it and the lofty eastern cliff. The word was passed, and every breath was hushed. A stream, which dashed down upon us over the brow of the precipice more than an hundred feet in height, mingled with the spray that whirled upwards from the rapid, forming a terrific shower-bath. The pass was about eight feet wide, and the error of a single foot on either side would have been instant destruction. As, guided by Sinclair's consummate skill, the boat shot safely through those jaws of death, an involuntary cheer arose. Our next impulse was to turn round to view the fate of our comrades behind. They had profited by the peril we incurred, and kept without the treacherous rock in time. The waves there were still higher, and for a while we lost sight of our friends. When they emerged, the first object visible was the bowman disgorging part of an intrusive wave which he had swallowed, and looking half drowned.—*Narrative of Discoveries on the North Coast of America, by T. Simpson.*



[The Model Prison, on the Separate System, at Pentonville.]

PRISON DISCIPLINE.

The number of criminal offenders confined in the prisons of England and Wales in the course of a year is nearly 130,000. Within the same period not fewer than 12,543 offenders have passed through a course of punishment in one of our largest criminal prisons, that in Coldbath-fields. It is obvious that very peculiar regulations must be adopted in these places, even with a view to compel subordination, if not to prevent the moral corruption which is likely to ensue where so many individuals, of such various shades of character, are thrown together. In the very lowest degree of prison discipline there must at least be provision for the safe custody of the persons confined; and this indeed was all which was attempted until within a comparatively recent period. The consequence was that the prisons became nurseries for crime and positive institutions for the encouragement of vice. The young offender committed for some thoughtless act, which left scarcely a stain upon his moral character, was placed in companionship with villains whose crimes were of the blackest dye, and consequently came out of prison fit for any desperate scheme. "I scruple not to affirm," said Howard, seventy years ago, "that half the robberies committed in and about London are planned in the prisons by that dreadful assemblage of criminals and the number of idle people who visit them." The description of the present state of one of the great metropolitan prisons will afford some notion of what the general condition of the gaols must have been before *any* attempts had been made to reform their management. In April, 1843, the Inspectors of Prisons, alluding to this place, remark:—"It has been our painful duty again and again to point attention to the serious evils resulting from gaol association and consequent necessary contamination in this prison. The importance of this prison in this point of view is very great. As the great metropolitan prison for the untried, it is here that those most skilled in crime of every form, those whom the temptations, the excesses, and the experience of this great city have led through a course of crime to the highest skill in the arts of depredation and to the lowest degradation of infamy, meet together with those who are new to such courses, and who are only too ready to learn how they may pursue the career they have just entered upon, with most security from detection and punishment, and with greater success and indulgence. The numbers committed, nearly four thousand per annum, which have rapidly increased, and are still increasing, render this a subject of still greater moment. Of this number about one-fifth are acquitted: many of these return to their associates with increased knowledge and skill in crime; with lost characters; with more hardened dispositions from their association here with others worse than themselves; and with their sense of shame and self-respect sadly diminished, if not utterly destroyed, by exposure to others, and by increased gaol acquaintances. Many others are sentenced to short terms of imprisonment, and in like manner soon get back again to their former courses and companions; and each of these becomes a source of greater mischief to the public, and of danger and seduction to the unwary and inexperienced. We most seriously protest against Newgate as a great school of crime. Associated together in large numbers and in utter idleness, frequently moved from ward to ward, and thereby their prison acquaintance much enlarged, we affirm that the prisoners must quit this prison worse than they enter it. It is said that prisoners are here but for a short time, and therefore that much mischief cannot be done. Many of them are here for three weeks and more, and are locked up together in numbers from three to twenty, for twenty out of twenty-four hours, without the restraining presence even of an officer, without occupation or resource, without instruction, except that afforded by the daily chapel service, and by the short visits which a chaplain can pay from ward to ward in so large a prison, and by the books which are placed in the wards. At the end of three weeks what remains to be learnt that any inmate of a ward can teach? what narrative of guilty or sensual adventure remains untold? what anticipation of future success and indulgence that has not been dwelt upon? Some few have courage to fly from such mischievous companionship, and ask, after a few hours' experience of the wards of Newgate, to be placed in the separate cells; but it is not to be expected that many will voluntarily fly from company which distracts thought,

to seclusion and their own unhappy reflections. The arrangements, however, for these few are such as to deter them from availing themselves of them. The solitary cells are the old condemned cells of Newgate, which are now used as refractory cells for those who offend against the discipline of the prison, or for those charged with unnatural offences or with the most brutal crimes; and if a young man, who has never before been in prison—who wishes to retain the little good that remains to him—and who is disgusted with the characters he has met in the prison, and the language and conversation he has been obliged to hear, requests to be put apart, he is removed to one of these cells. They are cold, ill-ventilated, dark, small, and even without a seat to sit upon. At our last inspection we found two young men of comparatively respectable appearance, who, disgusted with the bad conversation, the oaths, and the indecent language which they said they had heard in the wards, requested to be alone; and who preferred solitude in these wretched cells to such companionship. One had been a month in separate confinement under the most unfavourable circumstances possible; and yet did not regret the choice he had made."

In the above picture we have an illustration of the past rather than the present state of the prisons of this country; and it may be added that the whole question of prison discipline is in as satisfactory a progress towards just conclusions as could be wished or expected. The erection of the Penitentiary at Millbank (now called the Penitentiary Prison) was the first proof of the government of the country having really taken up the matter. It was projected many years before the building was commenced in 1813; and finally it could have provided for the accommodation of 800 males and 400 females in separate cells; but the numbers confined here have at all times been much below this amount. The boundary wall of Millbank Prison is nearly three miles in extent, with only one entrance-gate. It encloses an area of sixteen acres, seven of which are occupied by the prison-buildings and thirty airing-yards, and the remainder is laid out as garden-ground. The plan of the prison buildings is most intricate; arranged in the form of a pentagon, though a sixth angle has been added. In each pentagon there are twelve cell-passages, each 152 feet long, or 1824 feet in each pentagon, or 10,944 feet in the six—a length of cell-passages two miles in extent. These passages are broken most inconveniently by 54 angles into lengths of 50 yards each; so that to command a view of 100 yards of the passages it is necessary to stand at one of the angles. Besides these cell-passages there are others communicating with the two infirmaries, the two chapels, airing-yards, punishment-cells, &c. There are 28 circular staircases and 12 square staircases, each of which is the same height as the building; making, in all, a distance of three miles to be traversed in going over that part of the building appropriated to prisoners. The Inspectors of Prisons state, that in consequence of the injudicious plan of construction, two or three times as many officers are required in the Penitentiary as would have been necessary under a better arrangement. The prisoners are chiefly persons sentenced to transportation or to death, whose punishment has been commuted to imprisonment, and military delinquents. In their last Report but one the Superintending Committee remark, that "in consequence of a distressing increase in the number of insane prisoners, the separate system has been relaxed." The prohibition of intercourse is now limited to the first three months; then a modified system of intercourse is allowed, consisting of permission to converse during the hours of exercise, with two or more fellow-prisoners, a principle of classification being observed with reference to age, character, and conduct; and the privilege is liable to be suspended. In their last Report the Committee state that eighteen months before the alteration of discipline took place, fifteen prisoners became insane; in the eighteen subsequent months only five. The Inspectors of Prisons in their Seventh Report state that the existing system of discipline "is neither calculated to deter from crime nor contribute to the personal reformation of the offender." The defective health of the prisoners has always been a great obstacle to the maintenance of an efficient discipline.

For a number of years those who have taken the warmest interest in the improved discipline of our prisons have been divided into the advocates of the "separate system" and of the "silent system." The former, often erroneously supposed to have been first adopted in the United States, was introduced into the Gloucester County Gaol in 1790. Its object obviously is to avoid, in as complete a manner as possible, the contaminating influences of the old system, where the prisoners were thrown together in a mass without any attempt at classification, and without the least employment. The use of the tread-mill and the introduction of various occupations was, of course, a great improvement upon the old practice; and as the gaols were generally too crowded to admit of each prisoner being placed separately, the "silent system" was adopted as the best which could be thought of under the circumstances. This system does not, however, prevent conventional intercourse by signs and other means, and prisoners who have seen each other in gaol naturally continue their intercourse when they meet each other after their release: while the man who desires to return to virtuous habits of life, and to secure a good character in the world, is at the mercy of his old associates.

The "separate system," as now understood, must not be confounded with "solitary confinement." Under the "separate system" the prisoner has occupations, and is visited many times a-day: he is separated only from his fellow-prisoners. It is at the new Model Prison at Pentonville that we must expect to see carried out the views of the most enlightened minds of the present day on the subject of prison discipline. The contest between the "silent system" (recommended by a committee of the House of Lords in 1835) and the "separate system" seems to have gradually become most favourable to the latter mode of discipline, though the "separate system" has often been confounded with the punishment of solitary confinement. The Model Prison is a place of instruction and probation, and not a gaol of oppressive punishment. It is for adults between the ages of eighteen and thirty-five: the reformatory prison at Parkhurst, in the Isle of Wight, for juvenile offenders, is on the same principle. The Commissioners for the control of the Model Prison are nominated by the Queen in Council; and the correct name of the place is "The Model Prison, on the Separate System." The objects to be kept in view are thus explained by Secretary Sir James Graham, in a letter addressed to the Commissioners in December, 1842:—"I propose that no prisoner shall be admitted into Pentonville without the knowledge that it is the portal to the penal colony; and without the certainty that he bids adieu to his connexions in England, and that he must look forward to a life of labour in another hemisphere. But from the day of his entrance into the prison, while I extinguish the hope of return to his family and friends, I would open to him fully and distinctly the fate which awaits him, and the degree of influence which his own conduct will infallibly have over his future fortunes. He should be made to feel

that from that day he enters on a new career. He should be told that his imprisonment is a period of probation; that it will not be prolonged above eighteen months; that an opportunity of learning those arts which will enable him to earn his bread will be afforded under the best instructors; that moral and religious knowledge will be imparted to him as a guide for his future life; that at the end of eighteen months, when a just estimate can be formed of the effect produced by the discipline on his character, he will be sent to Van Diemen's Land, there, if he behave well, at once to receive a ticket of leave, which is equivalent to freedom, with the certainty of abundant maintenance, the fruit of industry; if he behave indifferently, he will be transported to Van Diemen's Land, there to receive a probationary pass, which will secure to him only a limited portion of his own earnings, and which will impose certain galling restraints on his personal liberty; if he behave ill, and if the discipline of the prison be ineffectual, he will be transported to Tasman's Peninsula, there to work in a probationary gang, without wages, deprived of liberty, an abject convict. This is the view which should be presented to the prisoner on the day when he enters Pentonville; this is the view which should never be lost sight of, either by him or by those in authority over him, until the day when he leaves the prison for embarkation; and when, according to the register to be kept of his conduct, the Governors will determine in which of the three classes he shall be placed."

The Model Prison is situated between Pentonville and Holloway, and occupies an area of six acres and three-quarters, surrounded by lofty boundary-walls. The first stone of the prison building was laid in May, 1840, and it has been completed at an expense of eighty-five thousand pounds. The cells are each thirteen feet long, seven feet broad, and nine feet high, and are all of uniform dimensions. Each is provided with a stone water-closet pan, a metal basin supplied with water, a three-legged stool, a small table, a shaded gas-burner, and a hammock, with mattress and blankets. There is a bell in each cell, which, when pulled, causes a small iron tablet inscribed with the number of the cell to project on the wall to direct the officer on duty. Each cell is warmed by hot air, and the ventilation is effected by means of perforated iron plates above the door of the cell, which communicate with a lofty shaft. None of the prisoners will ever be seen by each other, and in chapel each has his separate box. The officers wear felted shoes, and can inspect the prisoners, whether in the cell or in the airing-yard, without being either heard or seen.

Each prisoner will be visited hourly during the day by a keeper, daily by the deputy-governor and chief officer; and the surgeon and schoolmaster will be frequently in attendance upon him. Books will be supplied to him, and the trade which he exercises will occupy his mind. The prisoners are to be permitted to lay their complaints before the visiting Commissioners. Many modes of secondary punishment have failed, but the one to be pursued at the Model Prison is an experiment founded on past experience of the deficiency of other systems, and promises at length to be successful.

The Indian Appetite.—No people so soon get tired of any particular diet as Indians; and their longings for change, even amidst the best cheer, are often truly ridiculous. The flexibility of their stomachs is no less surprising. At one time they will gorge themselves with food, and are then prepared to go without any for several days, if necessary. Enter their tents; sit there, if you can, for a whole day, and not for an instant will you find the fire unoccupied by persons of all ages cooking. When not hunting or travelling, they are in fact always eating. Now, it is a little roast, a partridge or rabbit perhaps; now, a tid bit broiled under the ashes; anon, a portly kettle, well-filled with venison, swings over the fire; then comes a choice dish of curdled blood, followed by the sinews and marrow-bones of deer's legs singed on the embers. And so the grand business of life goes unceasingly round, interrupted only by sleep! Another physical singularity of the northern tribes is, that though capable of resisting, with great fortitude, the most intense cold, they are wonderfully fond of fire. At an establishment, even when the weather is mild and pleasant out of doors, they are to be seen heaping on fuel in the house, and actually sitting cross-legged on the hearth, where a white man would speedily be roasted.—*Narrative of the Discoveries on the North Coast of America, by T. Simpson.*

Placard-Printing at Vienna.—There is a printing-office in Vienna the sole employment of which is the announcement of these fetes, plays, and concerts; nothing else being printed there but placards. The proprietor of this establishment, Mr. Hirshfeld, has many people in his service, who thoroughly understand the most striking way of announcing such matters to the street public, by the judicious arrangement of the alluring words "Bal Brillant," "Magic Illumination," "Rose-tinted Garments of Pleasure," &c. I visited this printing-office; where the readers were employed in correcting the style and orthography of writers, &c., and preparing their eloquent productions for the press. The monster types are all of wood: the effect of the great black letters upon men's eyes and fancies is always speculated on; and the pictorial announcements of estates for sale by lottery, when all the letters are composed of pictures of castles and rural views, and where every million is represented entwined with the elegant flowery wreaths of hope, are really masterpieces in a psychological as in a xylographic point of view. The unusual words, or those that do not frequently occur, are composed, as occasion may require, from single letters; but the celebrated names, Strauss, Lanner, im Sperl, Elysium, Prater, Golden Pear, &c., are cut out of single blocks, and many duplicates are always kept ready for use at Hirshfeld's. It is the same with the standing phrases, such as "Splendid Illuminations," "Dancing Soiree," &c. Whoever has arrived at the honours of stereotype in Hirshfeld's printing-office, may deem himself a celebrated man within the walls of Vienna. It is somewhat remarkable, although natural enough, that even these kind of announcements and posting-bills, on which the most innocent things in the world are made known to the public, are subject to the censorship, in fact to a double censorship,—firstly, to the supreme censorial authorities, who bestow the "imprimatur;" and secondly, to the subordinate police authorities, who make any emendations held necessary according to circumstances and localities. "They play them a trick for all that, sometimes," said my bill-sticker, whom I encountered in the night as before mentioned. "Lately there was a ball at Sperl, where they danced till six o'clock in the morning, although they announced on their bill that it was to end after midnight: and when they were called to account by the police, they said that six o'clock in the morning was after midnight."—*Austria, &c., by J. G. Kohl.*

Music in the North of England.—In the densely peopled manufacturing districts of Yorkshire, Lancashire, and Derbyshire, music is cultivated among the working classes to an extent unparalleled in any other part of the kingdom. Every town has its choral society, supported by the amateurs of the place and its neighbourhood, where the sacred works of Handel and the more modern masters are performed, with precision and effect, by a vocal and instrumental orchestra, consisting of mechanics and work-people; and every village church has its occasional oratorio, where a well-chosen and well-performed selection of sacred music is listened to by a decent and attentive audience, of the same class as the performers, mingled with their employers and their families. Hence the practice of this music is an ordinary domestic and social recreation among the working classes of these districts, and its influence is of the most salutary kind.—*Hogarth's History of Music.*



[Bl[illegible]n.]

LANGDALE, WESTMORELAND

A STRIKING peculiarity in English poetry is the intense enjoyment of natural scenery which, in all its varieties, it exhibits. The poetry of our own time in particular owes much of its charm to this source. Among recent poets Wordsworth has perhaps done more than any other to diffuse an intelligent enjoyment of the beautiful in nature. It was long the fashion to name him the Lake Poet, as some others have been called Cockney poets; and small wits, when they repeated the epithet, fancied they said something remarkably sagacious. He had little need to be ashamed of the title. If it had been meant to characterize his poetry, however, he might with more truth have been called the Mountain Poet. His verse breathes the mountain air in every stanza. It has the same grandeur and simplicity, the same free, fresh, and varied aspect. He is eminently the interpreter of what he has finely termed "the voice of the mountains."

Intelligent people sometimes suffer themselves to be repelled from his poetry by its simplicity: they complain of it as being wearisome, and as being often without an apparent purpose. We are very warm but not unqualified admirers of his poetry: a little more condensation frequently appears to us desirable. If it is mountain-like in its beauties, it is so also in other respects: the beauties are eminent, but we must sometimes traverse long wastes ere we reach them. But that the poetry of Wordsworth is ever purposeless we cannot admit: it rather seems to us that the predominant purpose is too apparent. The purpose does not indeed always lie on the surface, but then it must be remembered that poetry of the higher kind is not to be read as a mere amusement. To be understood it must be studied. This Wordsworth himself says most distinctly, and he does not write for easy readers. Perhaps none of our poets has so thoroughly studied poetry as an art as Wordsworth, and hence it may have happened that he has written in a more calm philosophic tone than any other: to which no doubt much of its want of attraction for those who are accustomed to the more stimulating style of other poetry is owing. If one point were kept steadily in view by those who express themselves unable to understand his poetry, or yield a cold assent to the praises they hear lavished on it, much of their dislike would perhaps be removed; at any rate they would be in a better condition to estimate it fairly. He has in the preface to the 'Excursion' laid down a great principle—which we think is often overlooked even by his admirers, and his poetry in consequence often misunderstood—the enforcement of which is a main object in all his poetry. He desires, he says, to proclaim

> 'How exquisitely the individual Mind
> (And the progressive powers perhaps no less
> Of the whole species) to the external World
> Is fitted:—and how exquisitely, too—
> Theme this but little heard of among men—
> The external World is fitted to the Mind;
> And the creation (by no lower name
> Can it be called) which they with blended might
> Accomplish:—this is our high argument.'

The whole passage deserves to be carefully studied in its connection: it is suggestive of nobler and deeper thoughts than a hasty reader would imagine; and the genuine student of Nature will find in it, if we are not mistaken, a key to some of her subtlest mysteries in the beautiful and the grand.

While the poetry which unfolds this great principle so unfolds it as to render it applicable to all times and places, there is a peculiar interest in following it over the ground it especially illustrates. We have heard admirers of Wordsworth, who live near him, and have therefore frequent opportunities of observing the fidelity of his descriptions, say that it is hardly possible for those who are not familiar with mountain-scenery and especially the scenery of his own "rocky Cumber

land,' fully to appreciate his poetry. Now if this were the case, we should be forced to admit that his is not poetry of a high order. But it is not so. Like all true poetry, although it must of necessity have a local habitation, it is in its spirit universal. Still, as we have said, it is pleasing to ramble over the ground it has rendered classic; and the observant student of Wordsworth by so doing will find much light thrown on his peculiar colouring; and much of his characteristic phraseology will be rendered more clear. Such a ramble would, in short, be the best possible commentary on Wordsworth, if the rambler were prepared to understand it.

Perhaps the poet has done more honour to no place than Langdale, and it would not be easy to point out another spot, even in the lake district, where the object we have referred to could be better attained, and the characteristics of Cumbrian mountain scenery be at the same time so well observed. It lies not at all out of the usual routine of excursions made by those who visit the lakes; hence it is often visited, though seldom explored so carefully as it deserves.

Without attempting to notice everything worth seeing, we shall point out two or three of the more interesting objects, and chiefly those spoken of in Wordsworth's poetry. Langdale, including Great and Little Langdale, is literally what its name imports, a long dale, which runs from Stakepass, near Borrowdale, in a south-easterly direction by the foot of the Sticklepikes to the Brathay by Elter Water. The vale itself is continued up to the head of Windermere, but the name ceases at the above limit. As in most of these dales, a little stream runs along the valley; and if there is nothing very noticeable in it, yet with the few humble cottages, and the somewhat more assuming farm-houses with their byres nestling under a screen of low green trees, which are here and there sprinkled along its banks—the rustic bridges crossing it at intervals—both bridge and cottage offering fair examples of that style of rural architecture Wordsworth has described with so pleasant an enthusiasm—it imparts a cheerful air to the scene, which finely tempers the austere grandeur of the surrounding mountains, while the soft fertility of the open valley, and the carefully cultivated mountain slopes, serve to blend fell and vale in graceful unison. The valley will reward one who wanders at his leisure along it with many an object of simple beauty. If he be one

> Whom Nature's charms inspire,
> And love of human kind,

he will be not only interested in the varied combinations of scenery which will meet him at every turn, but will catch many a glimpse of homely half-antique manners and quaint costume that Teniers or Wilkie might have painted, or Washington Irving have delighted to sketch. For the man of science Langdale has other attractions: with the geologist it is as truly classic ground as with the poet. Sedgwick has, in the masterly series of papers on the Cumbrian system, read before the Geological Society, described these rocks in detail, with a zest so natural to him; and he mentions the valley in his 'Letters on the Geology of the Lake District,' appended to Wordsworth's 'Scenery of the Lakes,' as an illustration of the effect of the great '*faults*' which are everywhere to be traced in the valleys diverging from Scawfell, and indeed throughout the Cumbrian mountain district. "Faults of different ages," he says, "sometimes intersected one another, and afterwards contributed to form one valley. Thus Langdale and the upper part of Windermere show the direction of the old diverging line of fault; but the lower part of the lake is in the direction of one of the more recent lines of fracture." The geologist should visit, too, the Thrang-crag slate-quarry, situated just against Langdale Chapel; it is one of the most interesting in these parts. The botanical traveller will find in Langdale much to observe. There is a rich profusion of the smaller ferns about the crags, and some of the rarer kinds may be met with on the stone walls that intersect the lower parts of the mountains, particularly about Stake-pass, while at the Loughrigg end of the vale the different flowering plants are in great variety and abundance.

But while there is much to please and instruct in the valley, it is on the higher ground that those more celebrated objects of which we are to speak are chiefly to be found. If the road which passes along the vale be followed, it will lead by Blea Tarn, situated in a little offset from Langdale. Here it is that Wordsworth has placed the residence of the 'Solitary,' who, if not the leading character in the 'Excursion,' is generally considered the most interesting. No lake tourist should omit to visit this glen; apart from its associations, it is one of the grandest in the district. We have, indeed, heard many who have visited it express disappointment, and declare that it owed much to the art of the poet. But they viewed it only from the road; Wordsworth has described it as he beheld it from a neighbouring height, and so it should be seen. "We scaled," he says,

> "Without a track to ease our steps,
> A steep ascent; and reached a dreary plain,
> With a tumultuous waste of huge hill tops
> Before us; savage region! which I paced
> Dispirited: when, all at once, behold!
> Beneath our feet, a little lowly vale,
> A lowly vale, and yet uplifted high
> Among the mountains; even as if the spot
> Had been from eldest time by wish of theirs
> So placed, to be shut out from all the world!
> Urn-like it was in shape, deep as an urn;
> With rocks encompassed, save that to the south
> Was one small opening, where a heath-clad ridge
> Supplied a boundary less abrupt and close;
> A quiet treeless nook, with two green fields,
> A liquid pool that glittered in the sun,
> And one bare dwelling; one abode, no more!
>
> *Excursion*, b. ii.



[The Solitary Farm House.]

To this description, as true as it is complete, we have nought to add. The drawing we have given is taken from a point perhaps a little lower than that from which Wordsworth described the scene, but it appeared to give a better notion of the place than any other we could select. the mountains in the distance are the Stickle or Langdale Pikes, the most rugged, perhaps the grandest, though not by any means the highest in the district It will be seen by the drawing that this is no longer a "treeless nook," a larch plantation has been carried down to the tarn's brink, to the no small injury of the severe grandeur of the scene, about the farm-house, too a few sycamores have arisen, to which we think Wordsworth himself would hardly object with the cottage and its "two green fields," they make quite a little oasis As he looks down from the heights on either hand, the visitor will be ready to exclaim, as did our poet—

> "Full many a spot
> Of hidden beauty have I chanced to espy
> Among the mountains, never one like this—
> So lonesome and so perfectly secure — *Ib*

But, as he gazes, this feeling of lonesomeness will so increase, that the 'one blue dwelling' will be welcomed as a relief to the mind, and an involuntary desire arise to visit it There is nothing unusual in the appearance of the cottage, it is just like all the other cottages in similar situations in this part of the country. It is built of rough unhewn stones with a roof of rude slate and a porch formed by two large projecting slate-slabs, the whole being encrusted with a rich variety of lichens fern, and mosses, which find firm lodgment on the uneven surface of the stones To us it hardly seemed so forbidding as Wordsworth represents it —

> "Homely was the spot,
> And to my feeling, ere we reached the door
> Had almost a forbidding nakedness,
> Less fair, I grant, even painfully less fair
> Than it appeared, when from the beetling rock
> We had looked down upon it —*Ib*

The reader may judge of it as well as he can from our sketch, which is at any rate like the place We are not aware that this cottage has been engraved before, except in a general view of the tarn and surrounding objects

Our poet describes this "little lowly vale as it appeared to him on a hot summer's day, and it has generally been thought to look best in fine weather We have seen it in sunshine and in storm, when spanned by a rainbow (always most beautiful as it stretches over a mountain), and when lit up by the solemn splendour of an October sunset and we know not which to think finest, each has a beauty all its own. That grand spectacle the Solitary describes as

> "Opening to his view
> Glory beyond all glory ever seen
> By waking sense or by the dreaming soul"

it will be remembered, occurred here The casual visitor must not look for aught like this but he will be fortunate if he be here amidst a storm, then he will be sure of a sight never to be forgotten The mountains which encompass the glen seem fashioned and arranged by the plastic hand of Nature for a true storm-region. At such a time the bare sharp pikes, with the lightning playing wildly around them, and the thunder echoing and re-echoing from side to side of the noble mountains, and the gloomy solitude of the whole, shut in as it appears by the dense wall of black clouds, impress the mind most powerfully with a feeling truly sublime.

[To be continued]

CURIOSITIES OF BRITISH NATURAL HISTORY.

SNAKES

[Continued from page 338]

A CELEBRATED naturalist, M Schlegel, has ventured an opinion that snakes never drink this is far from being correct. Dr Cantor observes that the greater number of Indian serpents are partial to the water, and, with the exception of the tree-snakes, not only drink, but moisten the tongue, which, as this organ is not situated immediately in the cavity of the mouth, becomes two different acts The same has been observed respecting African serpents, and the same applies to our common snake Not only does it drink, but it is extremely partial to milk Mr Bell states that a tame one in his possession was accustomed to come to his hand every morning for a draught of milk, which it did of its own accord, and both in England and on the Continent it is accused of invading the precincts of the dairy in order to obtain its favourite beverage Latreille says, "It is asserted that it is very fond of milk, and that it even makes its way into dairies for the purpose of drinking what is kept there and further, that it sucks the teats of cows and sheep The latter part of the story is decidedly the offspring of ignorance, but we believe the former part We have heard it frequently affirmed by persons in the country that snakes invade dairies for the sake of the milk and that they have themselves witnessed them in the act of drinking it If M Latreille had tried a snake with this fluid, he would not have deemed, as he does the whole account a fable fit only to be derided Other snakes and, if we mistake not the cobra are also fond of milk, and surely it is not very preposterous to suppose that farm house dairies in parts of the country where snakes are abundant should be visited by them in their wanderings and the attractive stores discovered be often invaded by them and their companions* Latreille states that this species sometimes surprises young birds 'for it climbs very easily sometimes it suspends itself from the branches of trees twisting its tail around them, sometimes it hooks on by means of its head placed between the forks of a twig We have seen, on more occasion than one, the snake entwined in the midst of the close-locked branches of an old hedge, but we do not believe that it ever climbs trees nor does its long, slender, fine drawn tail appear, as far as our experience goes, to possess that grasping power so remarkable in the short tail of the boa or python, neither does it kill its prey by entwining them in its coils When irritated, the snake hisses violently with anger, vibrates its "double tongue,' and elevates its head, its eyes sparkle, its body swells, and it emits a disgusting odour It is however a timid animal and is disposed rather to escape than oppose an enemy That it can be tamed numerous experiments prove, and further, that it acquires feelings of attachment to its protector This was the case with one in Mr Bell's possession, which when let out of its box would come to him and crawl under the sleeve of his coat, for the sake of the warmth. In the collection of the Zoological Society is the preserved skin of a snake which lived eleven years tame in the possession of a Mr Cristman, to whom it showed great attachment "It is brought up,' says Latreille "in houses, and appears to be not insensible of the kind attentions of those who caress it, sipping saliva from their lips, and delighting to conceal itself under their dress, twining,

* We learn that an amphisbæna, living a short time since in the Zoological Gardens, took milk very freely and subsisted on it for six months The boa constrictors in the same gardens drink water chilled, always before they feed, and their mode of drinking is by thrusting the head into the pan of water.

without doing any injury, round their arms or neck. In Sardinia the young women, according to Lacépède, tame the ringed snake, feed it themselves, putting into its mouth the food they have prepared; and the inhabitants of the country regard these snakes as animals of good omen, suffer them freely to enter their houses, and would think that they had driven fortune away if they had put to flight these innocent little creatures." ('Hist. Nat. des Reptiles.')

Like all the rest, the ringed snake sheds its cuticle, assuming a more vivid colouring. The frequency of this change depends on the state of health and feeding of the animal. Mr. Bell states that he has known it cast its slough four or five times during the year; it is always thrown off by reversing it, the rent taking place at the neck: before this change the snake is inactive and blind, the cuticle covering the surface of the eyes, and which is shed with the rest, becoming opaque; the whole slough is perfect, the animal slipping out, and assisting itself by creeping through thick brushwood.

The snake passes the winter in a state of torpidity, choosing for a place of hybernation some sheltered retreat, either under decayed masses of wood, in the hollow roots of an aged tree, or beneath dense brushwood and dried herbage: here numbers often collect, coiling themselves together for the sake of preserving a due degree of temperature.

The ringed snake seldom exceeds three feet in length, though we have seen Continental specimens approaching four feet.

This species (and the same may be said of the viper) is not indigenous in Ireland, and the attempts that have been made to introduce it have failed, not because soil or climate is unfavourable, nor yet on account of St. Patrick's malediction on reptiles, but because the country-people finding them have been filled with alarm and horror, and assiduously hunted them out and destroyed them.

The Viper (Pelias Berus) is not uncommon in many parts of England, frequenting dry woods, sandy heaths, peat lands and sunny banks, and similar places. In Scotland it is more numerous than the common snake. In some parts of Yorkshire vipers are abundant, and they are so in all the chalk counties. Vipers vary considerably in colour; hence we have the black viper, the blue-bellied viper, the red viper, the common viper, &c., which some naturalists have ventured to regard as distinct species—whereas the truth is they are mere varieties, as is now satisfactorily demonstrated.

Happily for us, this is our only venomous reptile; and, dreaded as it is, it is by no means so dangerous as reported. It never commences an attack, and turns to bite only when driven to self-defence or suddenly molested; nor is its bite necessarily fatal. We have ourselves known persons bit by vipers—one a relative: he was punctured on the thumb: the part swelled and inflamed, and the inflammation (with considerable pain and constitutional irritation) ascended the absorbents to the axillary glands; with a little care, however, in a few days every bad symptom was removed. We have, indeed, heard of cases in which death has resulted from a viper's bite, but we have never been able positively to authenticate an instance, though we are willing to admit that, as the effects are much more severe in some instances than others, persons of a highly excitable or feeble temperament may have sunk under the action of the poison, especially if the animal was in full vigour and activity when it inflicted the wound. It is a remarkable fact that the poison of venomous snakes may be swallowed with impunity, that is, if the mouth or throat be utterly free from any wound or abrasion of the cuticle; internally taken it is perfectly inert—and this has been proved by repeated experiments. The venomous fluid is pellucid, tasteless, and resembles a thin solution of gum-arabic in water. It evidently contains an acid, for it slightly reddens litmus-paper; Dr. Cantor found this the case with the poison of numerous species of terrestrial Indian serpents and several species of marine serpents, and Dr. Harlan observed the same in his experiments with the poison of the rattlesnake. The poison is secreted in a sac at the base of each poison-fang, which is tubular, or rather, which incloses a groove on its external part; and through this the fluid passes when the animal inflicts a wound. In a state of rest, the poison-fangs fold backwards along the margin of the jaw, and are covered by a fold of skin; but when the viper is about to strike, it erects these fangs, throws itself into a coil, elevates its head, abruptly bends backwards its neck, launches its head forwards, strikes its teeth into its assailant, and instantly reassumes its position, the whole being the work of a single moment. Small animals, as mice, rats, birds, &c., are immediately affected by the poison, and soon perish. The viper often attempts to swallow prey too large to pass down the œsophagus, which perhaps is not as capable of dilatation as in the common snake. Mr. Bell has in his possession a small viper taken on Poole Heath, in Dorsetshire, which was taken in a dying state, having forced down a mouse, which had caused the skin of the neck to burst in several places. Mr. J. C. Cox found a viper in the neighbourhood of Lausanne, which had swallowed a common lizard nearly as long as itself, and which had forced a hole through the side of the viper, one of its fore-legs protruding. ('Mag. Nat. Hist.,' 1838, p. 238.)

The viper is ovoviviparous, the young being excluded from the egg previously to parturition. So requisite is the heat of the sun for this development of the young, that the female viper may be often seen extended in the genial rays, basking with flattened body, and unwilling to remove from the spot on the approach of danger. The young vary in number from ten to twenty, and are alert and active from their birth.

We have often heard it asserted, though we have never been able to verify the statement, that the young vipers when alarmed hastily retire within the mouth of their parent, and lodge in the stomach or œsophagus till the danger is passed. To this circumstance Mr. Bell, in his work on British reptiles, makes no allusion. Mr. Blyth (See Loudon's 'Mag. Nat. Hist.,' 1837, p. 441) observes respecting it, "I have been informed of this by so many credible eye-witnesses, that I cannot hesitate in yielding implicit credence to the fact. One man particularly, on whose word I fully rely, tells me that he has himself seen as many as thirteen young vipers thus enter the mouth of their parent, which he afterwards killed, and opened for the purpose of counting them. The following extract shows that the habit is common to other venomous serpents, all of which are, I believe, without exception ovoviviparous. It is stated of the rattlesnake, in Hunter's 'Memoirs of a Captivity among the North American Indians,' that 'when alarmed, the young ones, which are eight or ten in number, retreat into the mouth of the parent, and re-appear on its giving a contractile muscular token that the danger is passed.'" Gilbert White says, "Several intelligent folks assure me that they have seen the viper open her mouth to admit her helpless young down the throat on sudden surprises, just as a female opossum does her brood into the pouch upon the like emergencies; and yet the London viper-catchers insist on it to Mr. Barrington that no such thing ever happens." When evidence is thus contradictory, it is difficult to know what to believe. We have seen vipers oft, but we never saw the occurrence

in question, nor do we know any naturalist who has himself seen it. Mr. Blyth, who devoted much time to the out-door study of our native animals, never witnessed it himself, though he believes it upon report. It has been well observed that much related concerning the habits of reptiles seems to be as confused as it is inexact. "Country-people, besides being inexact in their accounts (although their occupations afford them good and frequent opportunities for making observations), are seldom to be depended upon: they are not nice observers of that which does not immediately affect their concerns; and disgust, or fear, or indifference incapacitates them from taking accurate notice: and these feelings induce contradiction, confusion, and exaggeration. Viper-catchers may be better authorities, as from use they overcome the not unnatural repugnance to these animals; but in their case, accuracy depends entirely upon individual intelligence, and, except the reporters be unexceptionable, their statements ought to be cautiously received."

The viper hybernates, several entwining together in a deep hole, or other secure lurking-place, and passing the winter in a state of torpidity.

In many parts of England the viper is better known by the name of *adder*, anciently, says Mr. Bell, written *nedre*, and afterwards *eddre*; it is from the Anglo-Saxon *nædre*, nether, lower—a far-fetched derivation, and we agree with Mr. J. Bladon that there is one much nearer at hand, viz. *neidr*, the ancient British and modern Welsh name for the reptile in question. In the plural form it is much more apparent, *nadroedd*, applied both to the viper and common snake.

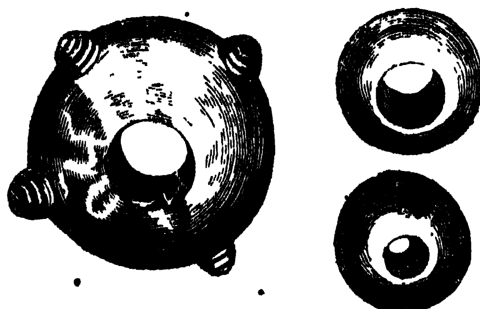
We shall conclude our observations on the viper by alluding to two singular superstitions connected with this reptile—perhaps not yet altogether passed away. From the earliest times the flesh of the viper was celebrated (like that of the skink, a kind of lizard) in the cure of various diseases, and is praised by Pliny and Galen. The ancients generally served the animal, boiled, like fish; but in our country viper-broth was the preparation in request. In England these reptiles were caught by means of stick with a fork or cleft at one end, for pinning the animal down, just behind the head: the man then seized the struggling reptile by the tail, and put it into a bag: and in this way the shops of the apothecaries were supplied.

Many persons have heard of the *ovum anguinum* of Pliny—the *glein neidr* of the ancient British—the adder-gem or adder-stone. These celebrated charms for curing various diseases are nothing more than antique blue, green, or striped glass beads of various sizes, and perforated. Pliny attributed their production to snakes convoluted together in summer, and notices the statement of the Druids with regard to their mystic production; and Mason, in his 'Caractacus,' gives this Druid's song:—

> "From the grot of charms and spells,
> Where our matron sister dwells,
> Brennus, has thy holy hand
> Safely brought the Druid wand,
> And the potent Adder-stone,
> Gender'd 'fore the autumnal moon?
> When in undulating twine
> The foaming snakes prolific join,
> When they hiss, and when they bear
> Their wondrous egg aloof in air;
> Thence, before to earth it fall,
> The Druid in his hallowed pall
> Receives the prize,
> And instant flies,
> Followed by the envenom'd brood,
> Till he cross the crystal flood."

Pennant says, "Our modern Druidesses give much the same account of the ovum anguinum (Glein Neidr as the Welsh call it, or the adder-gem) as the Roman philosopher does, but seem not to have so exalted an opinion of its powers."

Mr. James Bladon states that the modern version in Wales is, that "it is formed of the saliva of adders upon the body of one of their number, which accounts for its being perforated." The person seizing it from the adders must hasten to cross the next stream; and if, before he can do so, he should be caught by the reptiles, who follow in full chace, he infallibly perishes. He adds, "I had one of these articles presented me some time ago, by a believer in its virtues, in whose family it had been for several generations. It is an irregular roundish bead, about five-eighths of an inch long, three-quarters of an inch in diameter, and with a perforation of about a quarter of an inch in diameter. The colour is bright green, and the substance apparently glassy; it is deeply striated longitudinally." ('Mag. Nat. Hist.,' Nov., 1839, p. 566.)



Adder-stones.

The viper is far inferior in size to the common snake, seldom exceeding two feet in length: its markings are too well known to need minute details.

The Sand-Plains of Hungary.—Immediately after crossing the Theiss, the traveller perceives that he has entered a new kind of country. At Szegedin, the first sand-plain begins, and the ground is no longer as perfectly flat as I have described it in the Banat. The plain is broken by little sand-hillocks; agriculture more and more gives way to grazing. The population consists either entirely of Magyars, or, at least, is thoroughly Magyarized. The sand of this district is very fine, and is mixed with fragments of shells. It extends so deep, that nowhere have the inhabitants yet succeeded in boring through it and reaching its clayey foundation. Large tracts are entirely desolate, without any trace of vegetation. In such places the sand is often raised by the wind into the air, as in the sand-storm of the Sahara. This sand-wind is much dreaded by the Hungarians, for in its course it often destroys the most fertile fields. Among the remarkable attributes of these deserts is the total absence of water. In the two hundred German square miles between Pesth and Szegedin there is no trace of running water, no single brook, river, or stream, and not even a solitary well, with the exception of one little bubbling spring which rises in a marsh near Ketskemet. Another peculiarity of these deserts is the total absence of trees. Everything is bare, desolate, and naked; nowhere rises a cooling grove, or even a solitary bush or tree. Sand-plains with sand-wind, green patches with wild birds, marshes with cranes and storks, soda-bogs covered with white powder, and occasionally meadows with fine cattle; such are the only varieties seen when travelling on a Puste. Occasionally a lonely Sallash or Tsharde, or a solitary herdsman's hut, gives token of human habitation; now and then a far-off pump rears and sways its long arm before us; and sometimes too, though more rarely, we behold the unfailing token of our approach to a town or village,—namely, a handsome, well-kept, large, white gallows!—*Austria, &c., by J. G. Kohl.*



[Chieftains of Cutch.]

TRIBES AND CASTES OF INDIA.—CUTCH.

CUTCH is a province in the most northern part of Western India, about one hundred and sixty-five miles in length from east to west, and sixty-five in breadth from north to south. Its boundaries are the river Indus on the west, the Gulf of Cutch and the salt-desert of the Runn on the east, the Great Runn on the north, and the Indian Ocean on the south. The province is distant about five hundred miles from Bombay. The name of Cutch is probably derived from the character of the coast, 'Cach' or 'Cach'ha' signifying a low maritime country. The most remarkable feature of the province is the Runn, which surrounds it on the eastern and northern sides. It is a desert salt-plain or marsh, extending from the western side of Guzerat to the Indus, a distance of one hundred and sixty miles, while it varies in breadth from four to sixty miles. From May to October it is covered by the sea, and at other seasons, when the waters have partially evaporated, the glare from the incrusted salt is so great, as usually to deter travellers from crossing it. At no time do the waters wholly disappear, and the general appearance of this desert salt-marsh is described by Mrs. Postans as resembling that of the ocean at ebb-tide. The mirage is often witnessed here. The Runn contains several spots which are not covered by the inundation, and an oasis of considerable extent, to which large flocks and herds are driven for pasturage. The aspect of the rest of the country is not very agreeable. On approaching it from Bombay the eye rests upon a dreary coast, whose low sandy surface is covered here and there with patches of stunted vegetation diversified with now and then a few palm-trees. The interior consists of a chain of irregular hills, running from east to west, covered with fragments of bare rock, down which, in the rainy season, the torrents rush impetuously, and, irrigating the plains on either side, a stunted brushwood springs up, which affords pasturage for sheep and goats. Volcanic débris and metallic scoria abound at the foot of these hills. The soil of Cutch is generally sandy, and, without a careful attention to irrigation, would be nearly unproductive. Besides the poorness of its soil, the processes of husbandry are very imperfectly performed, and the implements of agriculture are of a very rude kind. Famines are experienced when the rains have not fallen abundantly for several successive seasons. Under the most favourable circumstances the produce of agriculture is insufficient for the consumption of the inhabitants; but this defect is repaired by an active commerce with other countries. Several native grains are cultivated for food, and wheat and barley are grown in the eastern parts of the province. Cotton is an important article of native produce, and is exported both in a raw and manufactured state. The sugar-cane thrives; and it should be recollected that Cutch is situated only two or three degrees farther from the equinoctial line than our West India Islands. The nights in the hottest season are always cool and refreshing. The general want of vegetable luxuriance is chiefly occasioned by the arid soil and climate. In the gardens belonging to the English residents at Bhooj, cabbages, cauliflowers, peas, beans, potatoes, and all sorts of pot-herbs have been raised with great success, irrigation keeping them in a luxuriant state during the hot season. Mangoes, guavas, plantains, shaddocks, and pomegranates do not attain perfection.

The common white grape, a small sweet black grape, and the musk-melon are the best fruits of the country. The castor-plant (Palma Christi) and the oleander grow wild in great abundance, and help to cheer the sterile prospect. A few common trees surround the villages, and among them are date-trees, which yield fruit of good quality. Beyond the cultivated patches the soil is frequently covered with a stunted thorny brushwood, and a singular kind of bramble, which grows to the height of about five feet, has a smooth green stem perfectly leafless, and bears clusters of bright red blossoms, which are used for pickling, and are also taken medicinally. The plantations and gardens are usually surrounded by hedges of the milk-bush, a species of euphorbia, the juice of which is so acrid, that in trimming them it is necessary to protect the face by a mask.

The horses of Cutch are pretty good, but are never used in husbandry, that kind of animal labour being performed by bullocks. Rich persons generally prefer the horses of Kattywar. Camels from Scinde and Malwar are much used for the saddle. The roads being generally too rocky or too sandy for wheel-carriages, horses and camels are in great request. In the northern parts of the country herds of fierce and untameable wild asses, sixty or seventy in a herd, are met with. Often, when the pasturage of the desert fails, they resort to the inclosed country and do much damage to the grain crops. Sheep and goats are very numerous. The wool is coarse, but answers very well for carpets, blankets, and other common manufactures, and would be adapted for finer stuffs if better prepared. Other animals which are common in Cutch are the buffalo, niel-ghau, deer, antelope, cheetah or hunting-leopard, hyæna, wild-cat, &c. The Runn abounds with wild animals and game.

At some early period a union took place of a pastoral tribe of Mussulmans from Scinde with the aboriginal shepherds of Cutch, by intermarriage with the women of the country. These Scindeans took the title of Jharrejahs, as a Rajpoot tribe, and the Rao, or reigning prince, is their head. The constitution of society is completely feudal. The province is divided into five great districts, and the lands in each are held by chiefs who pay no rents, but owe military service to the Rao. The hereditary succession to these lands is liable to interruption, and depends upon the will of the Rao. The next class of landholders owe immediate service to their respective chiefs. The religious classes hold villages and lands for religious and charitable purposes; and from these the Rao derives no revenue. This system of feudatories has often occasioned the country to be torn and distracted by contending factions, the inferior chiefs supporting their immediate lords against their lord paramount, the Rao, and both parties hiring bands of mercenaries, who pillaged the peaceful inhabitants without mercy. So strongly did the feudal system pervade the country at one period, that most of the existing towns are overlooked by the ruined castle which once formed the stronghold of some chief, like the old castles which frown on the banks of the Rhine, or, in centuries long past, like those which in Stephen's reign became so numerous in England. Cutch is now under British protection, and the old bulwarks of society, however serviceable they might at one time have proved, are comparatively useless now for all essential purposes of social good. In 1816, after the interference of the British government had for several years been earnestly desired, a treaty was entered into with the reigning prince, and a subsidized British force was stationed in the country with a view of supporting him against his factious chieftains; but in consequence of the atrocities of this ruler, a revolution was effected, in 1819, under our auspices, the result of which was to place his infant son on the throne. During his minority the country was governed by a regency, of which the British resident was a member. The resources of the country are of little value; even the Rao's subsidy does not pay the troops, and repeated remissions have been made in its amount: the political influence of either prince or people is insignificant; and it is only as a frontier-station that Cutch is of importance to us.

The population of Cutch is about 400,000, one-half of whom are Mohammedans, and the remainder Hindoos and seceders from strict Hindooism. Owing either to their equality in numbers, religious indifference, or some other cause, both the great religious bodies display a sort of latitudinarianism, which looks very much like liberality of spirit. The Hindoos join the Mohammedans in all their festivities, and the Jharrejahs, although believers in the Koran, practise many Hindoo observances. One of the national religious festivals is in honour of the Cobra Capella, to which a temple is dedicated, and this snake-worship is attended by the Rao and the whole population of Bhooj. The Jains, Kanphuttees, and Kaprias are Hindoo seceders. A dread of the destruction of animal life is the principal characteristic of their creed. The Jains are so strict on this point, that they wear a piece of gauze over the mouth to prevent any insect entering, lest it should be destroyed; and they sweep the ground before them as they walk along, to prevent their accidentally destroying life, and with the same object take no food after sunset, and strain the water which they drink. The poor and helpless of all sects are under their care, and the produce of about twenty villages belonging to their order is distributed in feeding the hungry and naked. The Kaprias are a very ancient fraternity, consisting of about one hundred and twenty members, who provide for the poor and for the wants of the brute creation out of their endowments. The Hindoo population reside chiefly in the towns; the Mohammedans, who belong chiefly to the military class, in the country. At Anjar there are forty-two Hindoo castes, each with a distinct and hereditary calling. At the same place, Mrs. Postans states that there are thirteen castes of Brahmens who subsist on public contributions, and when her work on Cutch was written, about 1836, the number of religious mendicants in the town was one hundred and forty. The practice of female infanticide is so general among the Jharrejahs, that Captain Macmurdo, in 1816, expressed his opinion that while the total number of the tribe was about twelve thousand, the number of females belonging to it by birth was not more than eighteen. Their wives were taken from other tribes; and by this means they kept their 'order' immaculate, as far as the pride of birth goes. The Jharrejahs are a proud and insolent military class, ignorant, indolent, and addicted to many degrading vices. Their physiognomy strikingly resembles that of the Jews. Mrs. Postans describes the Cutchees generally as a strong, well-proportioned, and muscular race of men, and the inhabitants of Mandavie, in particular, as uncommonly good-looking.

The towns in Cutch are not numerous. Mandavie, the principal sea-port, contains about fifty thousand inhabitants, and is remarkable for its commercial and maritime activity. It is surrounded by a strong wall, having bastions, gates, and wickets. Some of the houses are two or three stories high, with terrace roofs, and are decorated with richly carved ornaments, but the greater proportion of them are of a mean sort; the streets are narrow and dirty, and infested by sacred bulls, unsacred dogs, and, after nightfall, by the buffaloes driven in from the suburban pastures. The bright and varied costume of the inhabitants gives, however,

a gay appearance to the place. The warehouses and granaries are well supplied with merchandise and produce. Mandavie possesses two hundred and fifty vessels of different kinds, rudely constructed, but of great strength. They are half-decked, with broad sterns, high bows, and heavy latteen sails on enormous yards, supported by a clumsy mast or two masts. In vessels of this kind, varying from twenty-five to two hundred tons, the Cutch mariners fearlessly navigate to a distance of three thousand miles, visiting Zanguebar and the distant parts of the east coast of Africa, the Red Sea, Arabia, the Persian Gulf, and India, as far as Ceylon. The native pilots use the quadrant, and steer by charts. The exports of Mandavie consist chiefly of cotton-cloths, and the most valuable imports are ivory, rhinoceros hides, and other productions of Africa. There are several other sea-ports. Bhooj, the modern capital, is an inland town, containing about twenty thousand inhabitants, and surrounded by extensive fortifications, which are, however, so badly planned as to add little to the strength of the place. The mosques and pagodas of white masonry, interspersed with plantations of date-trees, give the town an agreeable appearance at a distance. The palace of the Rao is rather an imposing structure, covered with white enamel; but the majority of the houses are mean. Anjar, another town of importance, situated in the most fertile part of the province, is surrounded by a wall forty feet high, strengthened by thirty-one towers, and contains about ten thousand inhabitants. At a distance it appears thickly wooded, in consequence of every little court being shaded by a favourite tree, often regarded as sacred, and decorated with a little coloured flag. The families of two or three generations usually reside under one roof, in a house resembling a sort of shed: the moveables generally consist of two or three rude bedsteads, a few earthen vessels, and half a dozen spinning-wheels. Cows and calves tenant the court-yard. In a temple at this place an old Hindoo devotee once maintained about five thousand rats, which he fed three times a day with grain, and summoned to their meal by a little bell. The cotton-cloths rank high amongst the products of town industry; and are admired both for their vivid colours and fanciful designs. The skill of the Cutchee workmen as brass-founders, embroiderers, and armourers, and the beauty of their workmanship in gold and silver, are highly appreciated in all parts of India. Science is unknown among the Cutchees; and literature has as little influence: their religion perverts instead of elevating their character. The Cutchees are in fact little better than semi-barbarians.

An Arctic Prospect.—The wind having fallen, and the ice relaxed, in the forenoon of the 12th, we pushed out through it to gain clear water. The day was bright and fine. The mountains stood forth in all the rugged boldness of their outline, displaying their naked rocky peaks and steep descents with such marvellous distinctness, that they seemed to touch the coast of which they formed the bulwarks. The swell being with us, as long as the calm continued we made some progress with the oars; but a northerly breeze springing up raised such a cross-sea, that we were in imminent danger of foundering, when we providentially discovered an opening through the ice, leading into the mouth of a small stream—between Backhouse and Malcolm rivers—flowing from an inner basin, where we found a secure and pleasant harbour. It was now three P.M.; and, incited by the beauty of the weather, I ascended the nearest hill, six or seven miles distant; whence I enjoyed a truly sublime prospect. On either hand arose the British and Buckland mountains, exhibiting an infinite diversity of shade and form: in front lay the blue boundless ocean, strongly contrasted with its broad glittering girdle of ice; beneath yawned ravines a thousand feet in depth, through which brawled and sparkled the clear alpine streams; while the sun, still high in the west shed his softened beams through a rich veil of saffron-coloured clouds, that over-canopied the gorgeous scene. Bands of rein-deer, browsing on the rich pasture in the valleys and along the brooks, imparted life and animation to the picture. Reluctantly I returned to the camp at sunset.—*Narrative of Discoveries on the North Coast of America, by T. Simpson.*

Commerce with India.—It would appear, from recent investigations, that we are now only beginning to appreciate at anything approaching to their just value the material resources of Hindostan. The idea of obtaining sheep's wool from British India would, a very few years ago, have been treated as an idle dream; and yet we see that in 1841 we imported thence, of that important material of manufacture, more than three millions of pounds. It has usually been held that cold climates are best suited to the production of fine wool, but this belief is seen to be erroneous. Dr. Forbes Royle justly remarks, that "fine-wool countries, such as Spain and Tibet, Australia, Van Diemen's Land, and the Cape of Good Hope, have rather dry climates, with a warm summer and a cold winter. The coasts and plains of Bengal are not well suited to the production of wool, but "the table-land of the peninsula, beginning with the Neelgherric hills, and proceeding along Mysore to the Deccan, Candeish, and Guzerat, presents large tracts of country affording a favourable climate, and abundant pastures for numerous flocks of sheep." Marwar, Malwa, Rajpootana, Hurriana, and the province of Delhi have natural pastures which support numerous herds of cattle and flocks of sheep. The wool of the latter is employed by the natives in making blankets, of different degrees of fineness, which form a considerable article of commerce. The Himalaya mountains likewise support on their southern face a fine breed of sheep. The great pastoral countries of Cabool and Bokhara might afford an almost unlimited supply of fine wool; and, although not the produce of British industry, its collection would prove an important branch of commerce to our merchants in the western districts of India, while payment for it would doubtless be made chiefly in British manufactures. The rice of Bengal has hitherto been considered very inferior to that of America, and was unable to bear successful competition with it, even under a "protecting" duty of a penny halfpenny per pound; so that when it was proposed by the tariff of 1842 to reduce this "protection" by 8*s.* 6*d.* per cwt., or very nearly a penny per pound, it was confidently predicted that the trade would be annihilated. To avert this evil an intelligent and enterprising merchant forthwith took measures for improving the quality and appearance of the shipments from Bengal: and from the success that has attended his first efforts in that direction there is every reason to believe that, ere long, the rice of India will be in every respect equal in appearance to that of Carolina, and that it will command as high a price in our markets. Some experiments on a respectable scale have recently been begun in Burdwan for the production of flax, the finer qualities of which are every year becoming more scarce and dear in Europe, and we may hope that this important material of manufacture will ere long be added to the list of our importations from India. Tallow has already been imported thence of so good a quality that it realized within 10 per cent. of the price obtained for the finest St. Petersburg tallow. Besides these articles India could furnish an almost unlimited supply of seeds yielding oils of excellent quality for food, or light, or manufacturing processes; and considerable supplies of the finest timber may be procured from Oude and Goruckpore, the coast of Malabar, and the east coast of the Bay of Bengal.—*Porter's Progress of the Nation*, vol. iii.

Good Manners.—Good manners are, to particular societies, what good morals are to society in general,—their cement and their security. The immoral man, who invades another's property, is justly hanged for it; and the ill-bred man, who by his ill manners invades and disturbs the quiet and comforts of private life, is by common consent as justly banished society. For my own part, I really think, next to the consciousness of doing a good action, that of doing a civil one is the most pleasing; and the epithet which I should covet the most, next to that of Aristides, would be that of well-bred.—*Chesterfield.*

Of Nature in Men.—A man's nature runs either to herbs or weeds; therefore let him seasonably water the one, and destroy the other.—*Bacon.*



[Highland Drover.]

DROVERS.

If we could exhibit as in a picture gallery some of the various characters who are gathered together with their flocks and herds at the fairs of merry England and the trysts of Scotland, the reader would acknowledge that scarcely any occupation could produce so many specimens of the human form of striking and picturesque aspect. The drovers are divided into several classes, but each offers rich subjects for the painter; and if we were to include not only those whose business it is to drive the live stock to the markets and fairs, but also those who breed and rear it, what varied and animated forms of life might be summoned around us. There is the shepherd of the South Downs and of Salisbury Plain, his congeners of the Lowlands and Highlands of Scotland, and the lassie that herds her parent's small flock on some romantic mountain spot that kindly puts forth a few blades of grass on which her hardy black-faced charge live till the time arrives for their journey southward; the Highlander wrapped in his tartan following his kyloes in the same direction, and the drover who is familiar only with Smithfield and the great roads in the suburbs of London; nor must we forget the old 'topsman,' who has truly the air of a dweller out of doors, but its savage wildness is a stranger to his features, which are noble and manly, with a free and piercing glance, and when the stock is selling well, lighted by a smirk which seems to express some contempt for the southrons, though he has no objection to their 'siller.'

In the present notice we promised to give some account of the different classes of drovers. According to Sir Walter Scott the Highlanders excel all others as herdsmen, but their peculiar characteristics are lost or of little value when the herd is exchanged for the flock. "The Highlanders," he remarks, "are masters of this difficult trade of driving, which seems to suit them as well as the trade of war. It affords exercise for all their habits of patient endurance and active exertion. They are required to know perfectly the drove-roads, which lie over the wildest tracts of the country, and to avoid as much as possible the highways, which distress the feet of the bullocks, and the turnpikes, which annoy the spirit of the drover; whereas, on the broad green or grey track, which leads across the pathless moor, the herd not only move at ease and without taxation, but, if they mind their business, may pick up a mouthful of food by the way. At night the drovers usually sleep along with their cattle, let the weather be what it will; and many of these hardy men do not once rest under a roof from Lochaber to Lincolnshire. They are paid very highly, for the trust reposed is of the last importance, as it depends on their prudence, vigilance, and honesty whether the cattle reach the final market in good order, and afford a profit to the grazier. But as they maintain themselves at their own expense, they are especially economical in that particular. At the period we speak of, a Highland drover was victualled for his long and tiresome journey with a few handfulls of oatmeal and two or three onions, renewed from time to time, and a ram's horn filled with whiskey, which he used regularly, but sparingly, every night and morning. His dirk, or *skene-dhu* (*i.e.* black knife), so worn as to be concealed beneath the arm or by the folds of the plaid, was his only weapon, excepting the cudgel with which he directed the movements of the cattle. A Highlander was never so happy as on these occasions. There was a variety in the whole journey which exercised the Kelt's natural curiosity and love of motion; there were the constant change of place and scene, the petty adventures incidental to the traffic,

and the intercourse with the various farmers, graziers, and traders, intermingled with occasional merry-makings, not the less acceptable to Donald that they were void of expense; and there was the consciousness of superior skill, for the Highlander, a child among flocks, is a prince amongst herds, and his natural habits induce him to disdain the shepherd's slothful life, so that he feels himself nowhere more at home than when following a gallant drove of his country cattle in the character of their guardian."* In No. 90 of the 'Quarterly Review' there is an interesting notice of a drover-poet, commonly called Rob Donn, *i.e.* brown Robert. He wrote in Gaelic, and the reviewer treats him as one of the true sons of song.

Allan Cunningham has given us a picture of the collected riches of a mountain-country—cattle, being assembled for their journey to the south: "The hills and vales of the interior Highlands, which, in rougher times, sent out, under a Graham or a Cameron, bands of armed men, now, in the season, pour forth the herds of cattle which they rear, to the eager markets of England, where a savoury mouthful is ever welcome. The cattle which form the drove are gathered together on a set day, and at an appointed place—the foot of a mountain, the side of a lake, or near a castle, or in the neighbourhood of a village, or, more likely still, a battle-field: herdsmen are selected to conduct the different portions into which the drove is divided, while, over all, a confidential person, a sort of chief, topsman as he is called in the Lowlands, presides, who directs all the movements, makes all the bargains, and is responsible to the owners for the profits. This person, the topsman, gives the order, a signal generally, when to move or halt: he is always busy, now in the front, and then in the rear, and is consulted by his subordinates in all difficulties. He knows the safest roads over the widest tracks; Shapfell is as well known to him as Shehallion: he prefers the greensward way, which is pleasant to the hoof of his charge, and affords them a mouthful, to the hard and dusty public road, which distresses the feet of his cattle, and has little in the way of food. English parties on their way to the north to look at the wild deer and wild hills, and trace the scenes of Scott or of Ossian, are often startled by a drove emerging from a glen, or rounding the base of a mountain, coming lowing along, urged or directed by their drivers, who, with wallet on back and staff in hand, are conducting them to the south. These topsmen are now generally paid for their labour and trust, but in days not yet distant the Highland proprietor accompanied his drove to the south, and with his profit in his sporran returned to his mountains."†

The English country drover, who meets the drovers from Scotland, is to this day much the same sort of man as he was fifty years ago, and his calling is one of the few which the sweeping influences of modern improvements have hitherto but little affected; railroads do not materially affect his trade, at least he professes he cannot perceive any difference. The cattle he drives have improved to a degree almost beyond belief, and as he surveys the different members of his drove or flock in advance of himself, he cannot see one representative of his old friends the Craven and other such coarse ungainly animals as it fell to his lot to drive some "four or five and fifty" years ago. The roads he travels have partaken of the general and beneficial improvements of the present century; but to his mind these are a disadvantage rather than a gain. Formerly he often crossed wide tracts of uncultivated waste lands and heaths of some miles extent, where the timid rabbit, the fleeter hare, and their joint enemy the fox, occasionally afforded him and his almost human companion, his dog, some sport. The cattle or sheep under his charge formed picturesque groups on these wide tracts; and Nature displayed her beauties around him: the golden blossoms of the prickly furze, the delicate blue bell, the deep green of some and the silvery appearance of other members of that beautiful class of plants the fern tribe—never seen to so much advantage, or with such feelings of pleasure and delight, as when planted on a barren heath by the hands of Nature, and contrasting with the yellow sand-banks or parched and stunted grass that feebly strives to show itself amid the carpet of purple heather that nearly covers the whole expanse, backed by the hills over which he toiled in the summer heat some four or five days before. Amid such scenes as these, perhaps lighted up by a bright morning sun, and the heavy dew-drops looking like crystals showered over the surrounding objects, he left the secluded hamlet, by eventide had supplied his beasts with fodder, and taken his place on the village green, discussing local news with the old or watching the merry-making of the young, retiring early to his rest, and closing his eyes while the village youths, untired by the labours of the day, rang a peal from the bells of the village church. In scenes like these, so peculiarly English, and capable of supplying painter or poet with subjects or themes, did the drover pass his life. It might be that, like Peter Bell, Nature never found the way into his heart, and that

> "At noon when by the forest's edge
> He lay beneath the branches high,
> The soft blue sky did never melt
> Into his heart: he never felt
> The witchery of the soft blue sky!
> * * * * *
> A primrose by a river's brim
> A yellow primrose was to him,
> And it was nothing more."

Perhaps so: and we will therefore follow him in the actual business of the day. The drover, then, calls on the graziers who have cattle or sheep to send to market or fair; and when he has collected a sufficient number, he proceeds on his journey, which, however interesting, is, we will suppose, from long familiarity, passed unregarded, except an occasional remark on passing some well-cultivated piece of ground which he knew forty years back a barren waste, where nobody thought of growing mangold-wurzel or cow-cabbage. His journey varies from one hundred miles per week, more or less, as the case may be, and within six or eight miles of London he surrenders his charge to the care of another man, and returns home to perform the same services over again, accompanied by his faithful dog, whose family he not unfrequently carries on either side of him, in the ample pockets of his smock-frock.

The drover who takes from the country drover the charge of the herd or flock resides in the suburbs of London, at a convenient distance to afford food or pasture to the numerous droves that arrive weekly for the supply of the metropolis. He is paid for sheep at so much the score, and cattle per head; and his business is to drive the cattle into the market, and to wait until they are sold and paid for. The average rate for cattle is nine pence per head; and as the number sold in Smithfield is one hundred and sixty thousand annually, a sum of 5000*l.* a year is paid to this class of drovers; allowing about five hundred head per week which are brought by steam, droves occasionally taken to market by country drovers themselves, and a certain number which are foddered and driven to market either from their own fields or the layers at

* The Two Drovers, in 'Chronicles of the Canongate.'

† Prospectus of Watt's engraving of 'Highland Drovers departing for the South,' from a painting by Edwin Landseer, R.A.

Islington. There are also above a million and a half of sheep driven into Smithfield yearly, for which the drivers are paid a considerable sum.

The drover is liable for any damage or accident that may happen to the stock until sold and delivered to a drover, who may be called a butcher's drover, for he only drives from the market to the shop or slaughter-house of the purchaser. The cattle generally arrive in the suburbs on Sunday morning, where the master-drover and his men are ready to receive them. These men he pays about 10*s.* per day, and they have besides the chance on their return of driving purchases for butchers who live along the road, of which they generally avail themselves. After resting the remainder of the day and night, the drover is up and stirring at a very early hour on Monday, as his drove must be at market by five, where the salesman is ready to receive them, and they are tied up according to his direction: if there is no room for this, they are formed into 'off-droves,' as described in our notice of Smithfield (No. 341, vol. vi., p. 302). This is too often a scene of great brutality, and too painful to be repeated. By daylight the poor animals are tired and sore, and frightened into the required position for the convenience of purchasers to examine them. The butcher now arrives, chooses such as suit his purpose, and, after chaffering with the salesman for some time, the bargain is struck. The salesman then takes out a pair of scissors, cuts a small portion of hair off the rump as a mark, and the purchaser repairs with him to the banker's to make the payment. The suburban drover is now told the beasts are paid for; on which he takes a knife from his pocket and cuts off all the loose hair from the tail, placing his distinguishing mark on the animals with a piece of red ochre. The town-drover seldom drives for any but butchers or other drovers. Some of them do not leave the market at all, but merely drive sheep in and out of the pens. Like the last class of drovers, they are licensed by the clerk of the market, pursuant to rules and regulations made by the city authorities. The licence must be renewed annually to entitle the holder to wear his badge, without which he could not stand in the market or drive cattle or sheep in the cities of London and Westminster and the suburbs. The charge for a renewal of the licence is 5*s.*, and in it the person of the drover is minutely described, with particulars respecting his age, trade, height, complexion, residence, colour of hair and eyes. When a drover is fined for ill-using cattle or sheep, it is endorsed on his licence, which in that case is not renewed without some trouble, and producing securities for future good behaviour.

PROGRESSES OF QUEEN ELIZABETH.

No. X.—1579-1586.

OSTERLEY Park, the newly completed mansion-house of Sir Thomas Gresham, was the first place visited by Queen Elizabeth in 1579. Her entertainment was magnificent, but we have no record of it, and even "the Devises of Warre, and a Play, at Austerley," a publication by Churchyard, whom we have before mentioned, has been unfortunately lost. Fuller (in his 'Worthies of England'), however, relates in his quaint style a little anecdote connected with the visit. "Her Majesty," says he, "found fault with the court of the house as too great, affirming that it would appear more handsome if divided with a wall in the middle. What doth Sir Thomas, but in the night-time send for workmen to London (money commands all things), who so speedily and silently apply their business that the next morning discovered that court double, which the night had left single before. It is questionable whether the Queen next day was more contented with the conformity to her fancy, or more pleased with the surprise and sudden performance thereof: whilst her courtiers disported themselves with their several expressions; some avowing it was no wonder he could so soon *change a building*, who could *build a change*; others reflecting on some known differences in this knight's family."

On the 16th of July the Queen left Greenwich for Havering. This she appears to have quitted on August 10, for Mr. Weston Browne's, Woodcroft Hall, where she stayed two days; then at the Lord Rich's, three days; at Lady Maltravers', Gosfeld, five days; at Mr. Waldegrave's, Smallbridge, two days; at Ipswich, four days; at Harwich, three days; at Lord Darcy's, three days; and at Colchester, where she arrived September 1, two days. We have no particulars of her entertainment on this Progress, but there is no reason to suppose it was less magnificent in its general character than her preceding Progresses, if we may judge by the preparation of the corporation of Colchester to receive her. On the 25th of July they "sent a letter to Mr. Morris, to let him understand of the Queen's coming unto Colchester, to prepare himself to make oration: first, for the hire of a horse, . . . 2*s.* 6*d.*
"For ward and horse-meat, and his own meat 1 8.'
The bailiffs and aldermen were to ride "upon comely geldings, with foot-cloths, in damask or satin cassocks or coats, or else jackets of the same, with satin sleeves in their scarlet gowns; with caps and black velvet tippets," the council attending on them, likewise mounted, "in grogram or silk cassock, coat, or jacket, with silk doublets, or sleeves at the least, in their livery murrey gowns, with caps," &c.; all which was no doubt punctually performed. She left Colchester on September 2, and visited in succession Mr. Tuke, at Layer Marney; Mr. Harris, at Maldon; Sir Thomas Mildmay, at Moulsham; Lady Petre, at Ingatestone: thence returning to Havering, and then to Greenwich.

In 1580 there are no particulars of any Progress whatever. The Queen was somewhat occupied in this year and the next with the negotiation respecting her marriage with the Duke of Anjou; and the splendid entertainments given to that Prince, which may have been the cause. The only events in the nature of visits in 1581 were, one to Captain Drake, whom she made Sir Francis, on board of his ship the Golden Hind, where she dined on the 4th of April, when so large a concourse of persons assembled, that a wooden bridge was broken with upwards of one hundred people on it, but fortunately no lives were lost; her accompanying, at Christmas, the Duke of Anjou, on his return to France—after his fruitless visit, and the long negotiations respecting her marriage with him, and a series of justs in the tilt-yard and other entertainments—with a numerous train of her nobility and gentry, as far as Canterbury, resting one night at Rochester. The noblemen specially appointed for the service of conveying the Duke to Sandwich being the Earl of Leicester, the Master of the Horse; Lord Hunsdon, her kinsman; and Lord Howard, the Vice-Admiral; the first being attended by a hundred gentlemen and three hundred serving-men, and the other two by a hundred and fifty gentlemen each. She also visited the Earl of Nottingham at Chelsea during this year, but we have no particulars of the visit.

Little is recorded of the Queen's Progresses during the few succeeding years. In the summer of 1582 she was at Hampton Court, Oatlands, and Hertford. In April, 1583, she was at Greenwich, from whence she issued a proclamation against "a pernicious sore in the Commonwealth," the custom of the nobility and gentry of maintaining "multitudes of unorderly servants," with costly badges and liveries, to attend them on

journeys, at court, and elsewhere. It must have been difficult to please the Queen: a scanty attendance when waiting on her would have been no doubt considered as wanting in due respect to her, and a full attendance was reprehended as "unorderly" and extravagant. In May she was at Richmond, the plague being then in London, where she received the Lord Mayor, elected in the previous year, caused him to be knighted, gave him her hand to kiss, and was "wonderfully well pleased in all things," says Strype, "saving for that some young gentlemen, being more bold than well-mannered, stood upon the carpet of the cloth of estate, and did almost bear upon the cushion; insomuch that her Highness found fault with the Lord Chamberlain, Mr. Vice-Chamberlain, and with the gentleman-ushers, for suffering such disorders." Towards the end of that month she spent five days at Theobalds with the Lord Treasurer Burleigh, who has left in his own hand-writing the appropriation of different rooms of his house for the accommodation of the Queen and her suite, of which we give the part more particularly relating to the Queen herself. "The south side, a third stage; a gallery for the Queen's Majesty; at the south end, in a tower, one chamber, with two pallet chambers—the Earl of Leicester; at the east side of the same gallery, towards the base court, in a garret, two rooms—1, The gentlewomen of the Privy Chamber; 2, their servants. At the north-west end of the gallery: two chambers, whereof one with a chimney—the gentlewomen of the bed-chamber; a bed-chamber in a turret—the Queen's Majesty; an inner dining chamber over the closet—the Queen's withdrawing chamber; a dining chamber—the Queen's privy chamber. A fourth stage: a chamber in the uppermost part of the south-east turret—Mrs. Blanche; a chamber in the turret over the Queen's bed-chamber (not appropriated): a chamber, with a pallet chamber over the privy chamber—Sir Christopher Hatton, Vice-Chamberlain; a gallery over the hall, with a closet vaulted with stone for evidences." This may serve to give an idea how the rest of her attendants were lodged, and there is no notice whatever taken of the menial attendants, who must have been numerous. The rest of the summer appears to have been spent at Greenwich and Richmond, unless she visited Sir William More at Loseley, which she certainly purposed doing, as Sir C. Hatton writes on the 5th of August to Sir William, "that in ten or twelve days the Queen intended to come to Loseley for four or five days," and desires that "everything may be got in order, and the house kept clean and sweet." On the 24th he writes again, that the Queen intends dining at Woking on the 27th, and to go to bed at his house; that he should have everything made sweet and meet to receive her; should avoid [remove] his family, and have everything ready; [modest stipulations from a visitor to a host, but this was perhaps the answer to Sir William's representation that his house was too small to receive her;] that the sheriff need not attend her, but Sir William, Mr. Lifield, and some other gentlemen, to meet her at Guildford." A sort of private visit without ceremony, to meet the gentleman's means, but whether it actually took place has not been ascertained.

In August of 1584 the Queen was at Oatlands, and seems to have resided there till November 12, when, on her return to London, the citizens, "to the number of two hundred of the gravest sort," in coats of velvet and chains of gold, on horseback, and a thousand of the companies on foot (having with them a thousand men with torches ready there to give light on every sight, for that the night drew on), received and welcomed her Grace." Her Majesty had then come to meet her parliament, who assembled on the 24th of the same month, and we have a curious specimen of the means taken to prepare a submissive House of Commons, which was even then felt to be a matter of importance, in a letter to the Earl of Leicester, "from the Court, the 12th of October, 1584," to his "very loving friends, the bailiffs, aldermen, and the rest of the town of Andover." He writes:—"After my hearty commendation: whereas it hath pleased her Majesty to appoint a parliament to be presently called, being steward of your town, I make bold heartily to pray you that you would give me the nomination of one of your burgesses for the same; and if, minding to avoid the charges for allowance for the other burgess, you mean to name any that is not of your town, if you will bestow the nomination of the other burgess also upon me, I will thank you for it, and will both appoint a sufficient man, and see you discharged of all charges in that behalf. And so praying your speedy answer herein, I thus bid you right heartily farewell. R. Leicester. If you will send me your election in blank, I will put in the names." A most admirable contrivance for ensuring fitting representatives.

The Queen's movements in 1585 appear to have been limited to interchanges between Richmond and Greenwich, with short visits to Mr. Secretary Walsingham at Barn Elms, Lord Nottingham at Chelsea, and Lord Burroughs at Lambeth.

There was no Progress either in 1586, the Queen merely changing from one of her own residences to another; but in May the Danish ambassador, Henry Ramelius, arrived in England, and the account of his reception at Greenwich, where the court was then held, is very curious.

"Now being in England and in the English court, he might (and no doubt did) mark the magnificence of her Majesty, in all respects admirable. Whereof a notable precedent was given in Whitsun week. At that time the said Ambassador, being at the court, was accompanied with certain English lords to her Highness's chapel, and placed not far from her Excellency, did hear Divine service so melodiously said and sung, both by voice and instruments of conceit, as a man half dead might thereby have been quickened. The gentlemen of the chapel, with the rest of the choir, bending themselves, both with skill and zeal, that day to honour their prince according to their place. The Bishop of Salisbury and others distinctly reading part of the Divine service, and in the presence of all the auditory doing such obeisance with knee and countenance as the presence of so gracious a sovereign as they had in their eyes did require. Now when this solemnity was ended, her Majesty departed, and so did the Ambassador, attended upon and accompanied unto the place appointed for dinner; where, standing near to a fair window fronting into the open court, he might (being in communication now with one and then with another English lord, as the Lord Charles Howard, Lord Admiral; the Lord Cobham, Lord Warden of the Cinque Ports, &c.) behold the royal service of her Majesty, very personable gentlemen thereto sorted carrying covered dishes, all of silver and gilt, very beautiful, themselves in velvet and silk, suitable in each respect, and as decently made, so decently worn; the trumpets sounding and the drums playing thereunto, a marvellous delightsome thing to hear, and a passing gallant sight to behold. When dinner was done, the Ambassador was made partaker of such courtly recreations as for that time were fit, wherewith he could not but be pleasantly conceited, considering that as everything was done with purpose to delight, so he, with others, must needs be accordingly affected. And as the better sort had their disports, so were not the ordinary people excluded from competent pleasure: for upon a green, very spacious and large, where

thousands might stand and behold with good contentment, there bear-baiting and bull-baiting (tempered with other merry disports) were exhibited, whereat it cannot be spoken of what pleasure the people took. For it was a sport alone of these beasts to see the bear with his pink eyes leering after his enemies, the nimbleness and wait of the dog to take his advantage, and the force and experience of the bear again to avoid the assaults; if he were bitten in one place, how he would pinch in another to get free; and if he were once taken, then what shift, with biting, clawing, roaring, tugging, grasping, trampling, and tossing, he would work to wind himself away; and when he was loose, to shake his ears, with the blood and slaver about his physiognomy, was a pittance of good relief. The like pastime also of the bull, and the horse with the ape on his back, did greatly please the people, who, standing round, some in ring upon the green, other some aloft, and some below, had their eyes full bent upon the spectacle, diverse times expressing their inward conceived joy and delight with shrill shouts and variety of gesture. Now the day being far spent and the sun in his declination, the pastimes ended and the actors therein weary, the Ambassador withdrew to his lodgings, by barge, to Crosbie's Place, where (no doubt) this day's solemnity was thought upon and talked of, if not by him, yet by his train, and perhaps (as like enough) of both. Now after this and many other English courtesies elsewhere very bountifully given and taken, the Ambassador, after the finishing of such affairs as he was put in trust withal, taking his leave both of the court, city, and country, returned towards Denmark on the 30th day of May next following," to surprise his countrymen, no doubt, with narratives of the entertainments of the English court, bear-baiting, bull-baiting, and the "horse with the ape upon his back."

In August the Queen went to Windsor; she was received, in state, by the mayor, Edward Hake, and the corporation: and on her birthday, Sept. 7, the mayor of that borough pronounced an oration in the Guildhall, "containing an expostulation, as well with the Queen's Highness' faithful subjects for their want of due consideration of God's blessings enjoyed by means of her Majesty, as also with the unnatural English, for their disloyalty and unkindness towards the same their sovereign." The leading feature in the oration is a passionate attack on the Catholics, occasioned by the discovery of Babington's conspiracy: it is interesting as embodying the received opinions of the time, and as being removed from the fulsome personal flatteries with which she was usually addressed: we select two passages—the first displaying the popular opinion, or rather defence, of the harsh policy which was then considered to be tolerant.

"But you will say, perhaps (for what is it you will not say to the slander of this blessed government?), that her Majesty's laws, made for the punishing of recusants, are so sharp, and over sharp, for the tender case of a religious and resolved conscience, that hereupon, for your contentment, you are religiously and resolvedly drawn into the participation of high and most desperate treason. Well, leaving to call you herein to the consideration of these her Majesty's laws (which you so term to be sharp, and over sharp), by comparing them with your own burning and bloody laws, by which your laws, not the purse, but the person, not punishing, but destroying, not of old, but old and young, not of men or women, but of men, women, and children, yea, of infants newly born, nay (I might say) scarcely born, not for preaching or open professing, but for believing only, have been so heavily known and felt within this land: leaving, I say, to deal with you in the behalf of her Majesty's most godly and just laws after any such sort, I only ask of you a question or two, and so I will leave you. Taking view of her Majesty's dispensation of justice from the beginning of her reign hitherto, what find you therein (allowing unto her Highness her sovereign power to establish religion within the land), what find you, I say, therein, that any subject of any sect or profession in the world may not tolerate and endure without either loss or hazard of life or of living? Is the difference of opinion in matters of religion, or the private mistakings in controversies of religion, in any of what sort or quality soever (not participating matter of treason or of flat recusancy) any cause to him or them to fear either loss of life, or impeachment of honour or credit, be it either in office, or in dignity, or in whatever else within this realm that may be said to be of profit or countenance unto the same? I suppose no: nay, you yourselves must needs answer me no."

We shall conclude with another passage—a retrospect of the state of England in the previous reign, which was of course intended to be complimentary to the policy of the virgin queen:—"The land possessed of strangers, these strangers most turbulent, most proud, most insolent, most aspiring, and (as England and the bordering people about us this day have cause to say, nay, rather by their lamentable experience to complain) to strangers most cruel, most bloody, most unsufferable: as by whom the sweet peace of this realm was so interrupted, so mangled, so defaced, that besides the delay and continual threatened tumults at home, our wealth of England, the men of England, the munition and forces of England, were wholly employed, nay, constrained to wait upon the wars; I say upon the unnecessary wars of these so dangerous strangers, yea, to be wasted and consumed even about the quarrels and ambitions of these so pernicious guests, so that truly it was then and is yet to be affirmed, that England, which at that time had no cause of war or breach of league with other nations, was enforced, or rather violently haled, to bear arms against them, even against France (if I may speak it) for the ambitious service of Spain. And while these things were thus sorted, while men, money, munition, and armour were in this wise expended, what was the sequel thereof, I pray you? What was the prosperity and success of the same? Calais was lost—Calais, the ray of England—Calais, the very door and passage into France—Calais, the honour of this realm, and the overlooker of the French nation, with the wealth and abundance of England, and which two hundred and sixteen years together had been in the quiet possession of England; I say Calais, with all this, altogether, all at an instant, at least within the compass of my days, was miserably lost and utterly forgone. To conclude, Calais being lost, what ensued thereupon? After the loss of Calais, the loss of all security and freedom, the loss of all prosperity and welfare, came rushing upon this little island, even as it had been an armed man upon him that is naked and despoiled of comfort. Such impositions, such leases, such taxes, new inventions and devices to draw away the remainder of the particular wealth of England (the common treasury thereof being wholly exhausted and consumed) to the maintenance of the unprosperous wars of King Philip, as surely if you will but look into the chronicles of that time, you shall see, and say, that if God, of his miraculous and extraordinary power and great mercy had not shortened those days, there had wanted very little of utter desolation to this our country: this I say, our ancient and flourishing country of England then, even then at the instant, to fall into such miserable servitude and bandage as all those countries are oppressed withall that in times past have been famous and flourishing estates, and are now languishing and spoiled provinces, subdued to the thraldom of the Spaniards."



[Falkland Palace, Fifeshire.]

FALKLAND.

However poor a country Scotland may have been in former times, its sovereigns were well provided with princely residences. There was the ancient palace of Holyrood, when affairs of state called them to the capital; the royal castle of Stirling, the Windsor of the north, the 'key' of the Highlands, adapted alike as a place of safety, and for regal magnificence in quiet times; and Linlithgow, a vast pile; besides Dunfermline and Lochleven Castle. Falkland was chiefly used as a hunting-seat and place of recreation during the summer and autumn. All these royal palaces were neglected after James VI. of Scotland had ascended the throne of England. Falkland is about thirty miles from Edinburgh, in Fife, a district including the county of Kinross. The German Ocean is its eastern boundary, and the Firths of Forth and Tay cut it from other parts of the country on the north and south sides. Secured from predatory excursions, its numerous harbours inviting commerce, Fife was the most prosperous county in Scotland before the Union. Numerous small and thriving towns sprung up on the margins of its friths, contrasting which with the comparative barrenness of the inland parts, induced James VI. to speak of Fife as "a grey cloth mantle with a golden fringe." The county is traversed by two ranges of hills, having a narrow plain on each side towards the friths, a more extensive plain running through the middle of the county. The latter is called the 'Howe o' Fife,' and also Stratheden, from its being the bed of the river Eden. The two most elevated hills are the Wester and Easter Lomonds, and the latter may be distinctly seen from Edinburgh. The small town of Falkland lies at the foot of this hill, which overshadows it so completely that during the winter-quarter of the year the sun does not shine upon the town. On the south, east, and west the country stretches out into a plain. Mr. Robert Chambers, in his 'Picture of Scotland,' speaks of Falkland as "a complete and last remaining specimen of the Scottish burgh of the sixteenth century." There is a small square market-place, from which lanes diverge in different directions. With the exception of one or two houses in the market-place, the houses are of very small dimensions, many of them of ancient date and thatched. Some of them are said to have been occupied by members of the royal household. Mr. Chambers states that "the last and former generations of the Falklanders were remarkable over the country-side for their good breeding, and until recently the old people had in their common speech a great number of phrases indicating the intercourse of their ancestors with kings and courtiers." The Palace overlooks the little burgh; the front forms one side of the public street, and an inn adjoins it at one end. The ancient castle, the predecessor of the present building, was a stronghold belonging to Macduff, earl of Fife. James V. completed the edifice as it now stands, but it was begun by one of his predecessors, whether James III. or James IV. is not known. James V., who had often held his court at Falkland, died at the palace; and Mary of Guise, his widow, was frequently there during her regency. The unfortunate Queen of Scots here occasionally enjoyed a respite from her troubles during her visits, occupying herself in the morning in the chace, or with trials of skill in archery in the gardens; the afternoon being devoted to chess, or music, or in reading the classics with Buchanan, who has been styled "the most elegant of pedagogues." James VI. was a frequent visitor at this palace before the English crown descended upon him. He was here when he was inveigled into the scheme laid for him by the Gowrie conspirators. Charles II. resided at Falkland for about ten days during his detention by the Presbyterians. The place was afterwards greatly neglected, and was tenanted only by the minister of the parish until about the end of the last century; but on a manse being built, the old palace was left without an inhabitant, and fell rapidly into decay. Roofs, floors, and all but the walls seemed fast hastening to destruction, when Mr. Bruce, of the Scottish State Paper Office, purchased the estate, and in 1823 commenced repairing the ravages of time and neglect. This gentleman died before he had completed his designs for restoring the edifice, but his niece and heiress fortunately followed up his views with equal zeal and good taste; and the result is that Falkland now presents a specimen of regal domestic architecture from which we may obtain a lively idea of the life of a Scottish monarch in the sixteenth century. The account published by authority of the Gowrie

conspiracy gives the following account of the habits of James VI.:—"His majesty having his residence at Falkland, and being daily at the buck-hunting (as his use is in that season), upon the 5th day of August, being Tuesday, he rode out to the park, between six and seven of the clock in the morning, the weather being wonderful pleasant and seasonable." At one end of the structure is a double tower, with a lower and uncastellated range of buildings running off towards the other end. The archway under the double tower leads to the court-yard. The large hall, or audience-chamber, with its carved and pointed decorations, is still entire. The palace gardens are now, or were lately, arable fields. About two hundred yards from the palace are the remains of an extensive court, used probably for tennis and other games and sports.

THE SOLFATERRA AND SOLFATARA OF ITALY.

In the geography of Italy we frequently find mention of the *Solfaterra* or *Solfatara*, sometimes one mode of spelling and sometimes the other being adopted; and sometimes evidently in allusion to a mountain, while at other times as evidently in allusion to a lake.

The Solfaterra is one of the mountains in the volcanic region which surrounds Naples; that region to which Vesuvius has imparted so wide-spread a celebrity. The tongue of land which forms the western extremity of the Bay of Naples has in it the town of Puzzuoli: near this town are the ruins of Cicero's Villa and of the Temple of Serapis; and a little farther on, between Puzzuoli and Naples, stands the mountain of Solfaterra, a mountain which seems to have exerted much influence on the character of the adjacent district. The soil, in every direction near Vesuvius and Solfaterra, is composed superficially of *tufa*, or light, porous, earthy, volcanic scoriæ. In an elevated part of this spot a public road from Naples to Puzzuoli has been excavated through the tufa, and called the Grotto of Posilipo. Clayey particles, pieces of felspar, and fragments of yellowish pumice-stone seem to combine to constitute this tufa.

The mountain of Solfaterra itself is much less imposing than Vesuvius, and has been the scene of fewer eruptions: but from an account of it recently given by Captain Basil Hall, we have evidence of the sulphureous nature of the internal structure of the mountain. "From Puzzuoli," says this writer, "we strolled on to Solfaterra, which has the appearance of being the crater of an ancient volcano, and indeed still emits sulphur fumes in sufficient quantity to justify the name ('solfaterra,' sulphur-ground) it has received from all time. King Murat, who gets credit for having set a-going almost everything, good or bad, that is now doing at or near Naples, established extensive sulphur-works in the centre of this crater (having no doubt a gunpowder object in view), and the situation, it must be owned, is well chosen. We took a look into these works, and were half suffocated for our curiosity. It appears that the earth, which is strongly impregnated with brimstone, placed in pots, is exposed to a heat considerable enough to melt the material they are in quest of, which separates itself from the earthy particles, runs together, or secretes, and then finds its way through a hole in the bottom into a conical sort of tub, in which it is allowed to cool till it becomes the sulphur of commerce." Captain Hall proceeds to state, that near the middle of the crater, the bottom of which is pretty smooth and horizontal, a stone let fall from the hand of the guide produced not only a tremulous motion, but just such a sound as might be expected if there were a hollow space beneath, caused by the crusting or hardening of the surface of a body of fluid, while the remainder was drawn away. According to this theory, the present flooring of the Solfaterra crater may be compared to the surface of a pond which, having been converted into ice, had been left in its place, while the water beneath had been drained off. It is said that King Murat, being desirous of ascertaining how far this speculation was correct, ordered a well to be sunk through the crater; but, after going to the depth of more than a hundred feet, no hollow space was found: the workmen were obliged to discontinue their labours, in consequence of the increased heat of the ground.

The town of Puzzuoli, which is about three miles from the west end of the Grotto of Posilipo, is surrounded and supported by masses of lava thrown out in former times from the Solfaterra. As to the grotto itself, considered as a high road, we may remark that it was formed by the Romans; and a story is told that King Robert of Naples, passing through it one day with Petrarch, required his opinion respecting a tradition that Virgil had formed the grotto by magic in a single night: to which the poet replied, that he saw many marks of iron, but none of demons. It would seem that there was much intercourse by this route, for Cicero's Villa and the Temple of Serapis were both near one extremity of it, while Naples, or Neapolis, was at the other.

The Temple of Serapis here alluded to is associated with several very remarkable geological phenomena, which seem to point to a singular connection between it and the volcanic region around the Solfaterra. Mr. Lyell, in his 'Treatise on Geology,' has drawn from the history and appearance of this temple several most important conclusions respecting the changes which the crust of the earth is undergoing in many parts. He finds that the relative level of land and sea must have changed twice at this part of Italy since the Christian era; each movement, both of elevation and of subsidence, exceeding twenty feet. The whole coast for a considerable distance north-west of Naples appears to have been similarly affected. In coasting along the shore from Naples to Puzzuoli, it is found, on approaching the latter place, that the lofty and precipitous cliffs of indurated tufa, resembling that of which Naples is built, retire slightly from the sea; and that a low level tract of fertile land, of a very different aspect, intervenes between the present sea-beach and what was evidently the ancient line of coast. At one spot Mr. Babbage observed, at a height of thirty-two feet above the level of the sea, an ancient mark, such as might have been worn by the waves; and upon further examination he discovered that the face of the perpendicular cliff, consisting of very hard tufa, was covered with barnacles, and drilled by boring testacea. At one spot the inland cliff is eighty feet high; and at its base a new deposit, constituting the fertile tract before alluded to, attains a height of about twenty feet above the sea; and since it is composed of regular sedimentary deposits, containing marine shells, its position proves that, subsequently to its formation, there has been a change of more than twenty feet in the relative level of land and sea. There is a part where an artificial sea-wall has been broken away, and which exposes a most remarkable alternation of tufa, marine deposits, and mosaic pavements; showing that the sea has at one time covered a part which at another time was dry tufa soil, and at another was covered with the mosaic pavement of a road or building.

The Temple of Serapis, situated on a tongue of land separating two bays, has been alternately in and out of the sea, according as the land in which it stands was sunk or elevated by some mighty convulsive agent beneath. The three columns which remain of this

temple were not noticed by antiquaries until 1750, their lower parts being immersed in the ground and their upper parts hidden by bushes; but when they were examined, they were seen to form part of the remains of a splendid edifice. The original plan of the building could be distinctly traced; it was of a quadrangular form, seventy feet in diameter, and the roof had been supported by forty-six noble columns, twenty-four of granite, and the rest of marble. The three pillars yet remaining are smooth and uninjured to the height of about twelve feet above their pedestals. Above this is a zone, about nine feet in height, where the marble has been pierced by a species of marine perforating bivalve. The holes which these animals have made are pear-shaped, the external opening being minute and gradually increasing downwards. From these circumstances, therefore, viz., the existence of twelve feet uninjured at the lower part of the columns, and of nine feet thus eaten away above, it has been inferred that the pillars must have been immersed in sea-water for a long period, at a time when their lower part was covered up and protected by strata of tufa and the rubbish of buildings; the highest part, at the same time, projecting above the water, and being consequently weathered, but not materially injured.

An inquiry has naturally arisen, whether these remarkable changes have been due to the varying of the sea-level or to that of the land-level. In many parts of the coast of England a variation in the relative levels may be accounted for either by accumulation of alluvial deposits or the wasting away of cliffs by the sea; but Mr. Lyell clearly shows that near Naples the land itself is in a state of undulation, rising and falling gradually, and thus giving rise to changes of relative level. From a comparison of all the data which he has collected from various quarters, Mr. Lyell has come to a conclusion that the ground on which the Temple of Serapis is built, and with it most of the ground near the Solfaterra, has undergone the following oscillations in the course of nineteen centuries:—First, about eighty years before the Christian era, when the ancient mosaic pavement was constructed, it was about twelve feet above the level of the same pavement in 1838: secondly, towards the close of the first century after Christ, it was only six feet above the present level; thirdly, by the end of the fourth century, it had nearly subsided to its present level; fourthly, in the middle ages, it was nineteen feet *below* its present level; lastly, at the beginning of the present century it was two feet above its present level; and it appears now to be again sinking. Hence it has been said that "the country about Naples is in such a constant state of geological oscillation as to furnish the idea of its being a mere crust of earth floating on a mass of melted lava, which, like the sea, is subject to elevation and depression."

So much for the *Solfaterra* and its vicinity. A few words may now be offered respecting the *Solfatara.* Between Rome and Tivoli is a lake called Solfatara, Lago di Zolfo, or Lacus Albula, into which flows continually a stream of tepid water from a smaller lake situated a few yards above it. The water is strongly impregnated with carbonic acid; indeed, the larger lake is actually a saturated solution of this gas, which escapes from it in such quantities at some parts of the surface, as to impart the appearance of violent ebullition. "I have found by experiment," says Sir H. Davy, "that the water taken from the most tranquil part of the lake, even after being agitated and exposed to the air, contained a solution more than its own volume of carbonic acid gas, with a very small quantity of sulphuretted hydrogen, to the presence of which, I conclude, its ancient use in curing cutaneous disorders may be referred."

It is such water as this, flowing over or through beds of lime, which gives rise to that peculiar carbonate of lime called *travertin,* much used in Italy as a building-stone. It also gives rise to floating vegetable masses, which Kircher once supposed to be islands mysteriously thrown up from the gulf beneath. Their formation has been thus accounted for:—The high temperature of the water, and the quantity of carbonic acid which it contains, render it peculiarly fitted to afford a pabulum or nourishment to vegetable life; the banks of travertin are everywhere covered with reeds, lichens, confervæ, and various kinds of aquatic vegetables; and at the same time that the process of vegetable life is going on, the crystallizing of the calcareous matter, which is everywhere deposited in consequence of the escape of carbonic acid, likewise proceeds, giving a constant milkiness to what from its tint would otherwise be a blue fluid. So rapid is the vegetation, that even in winter masses of confervæ and lichens, mixed with deposited travertin, are constantly detached by the currents of water from the bank, and float down the stream, which, being a considerable river, is never without a large number of these floating masses; they are sometimes only a few inches in size, and composed merely of dark green confervæ, or purple or yellow lichens; but they are sometimes many feet in diameter, and contain seeds and various species of common water-plants, more or less encrusted with marble. Sir H. Davy once fixed a stick in a mass of travertin covered by the water, and examined it ten or eleven months afterwards. There was a hard mass several inches in thickness adhering to the bottom of the stick; the upper part was a mixture of light tufa and the leaves of confervæ; below this was a darker and more solid travertin, containing black and decomposed masses of confervæ, and in the interior part the travertin was more solid and of a grey colour.

The Tame Salmon.—The social as well as the pugnacious habits of the salmon have been recorded in the account of a very interesting experiment made in 1829, by Mr. George Dormer, of Stone Mills, in the parish of Bridport. Having caught in his mill-dam a female salmon about twenty inches long, he put it into a small well, which measured only five feet by two feet four inches, and in which the water was only fifteen inches deep. The salmon remained in this well *twelve* years, and died in the year 1842. About five years ago persons came from great distances to witness her doings, and there are many in Exeter who can testify to the truth of the following facts:—"She would come to the top of the water and take meat off a plate, and would devour a quarter of a pound of lean meat in less time than a man could eat it; she would also allow Mr. Dormer to take her out of the water, and when put into it again, she would immediately take meat from his hands, or would even bite the finger if presented to her. Some time since a little girl teased her by presenting the finger and then withdrawing it, till at last she leaped a considerable height above the water, and caught her by the said finger, which made it bleed profusely: by this leap she threw herself completely out of the water into the court. At one time a young duckling got into the well, to solace himself in his favourite element, when she immediately seized him by the leg, and took him under water; but the timely interference of Mr. Dormer prevented any further mischief than making a cripple of the young duck. At another time a full-grown drake approached the well, and put in his head to take a draught of the water, when Mrs. Fish, seeing a trespasser on her premises, immediately seized the intruder by the bill, and a desperate struggle ensued, which at last ended in the release of Mr. Drake from the grasp of Mrs. Fish, and no sooner freed than Mr. Drake flew off in the greatest consternation and affright; since which time to this day he has not been seen to approach the well, and it is with great difficulty he can be brought within sight of it. This fish lay in a dormant state for five months in the year, during which time she would eat nothing, and was likewise very shy."—*Scrope's Salmon Fishing.*



[The Virgin proceeding to the Temple.—From the choir of Santa Maria Novella.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XVI.

DOMENICO DAL GHIRLANDAJO: b. 1451, d. 1495.

DOMENICO dal Ghirlandajo was also employed in the Sistine Chapel, but he was then young, and of his two pictures there, one only remains—The Calling of St. Peter and St. Andrew—so inferior to his later productions, that we do not recognise here the hand of him who became afterwards one of the greatest and most memorable painters of his time.

Domenico Corradi, or Bigordi, was born at Florence in 1451, and was educated by his father for his own profession, that of a goldsmith. In this art he acquired great skill, and displayed in his designs uncommon elegance of fancy. He was the first who invented the silver ornaments in the form of a wreath or garland (*Ghirlanda*) which became a fashion with the Florentine women, and from which he obtained the name of Ghirlandajo, or *Grillandajo*, as it is sometimes written. At the age of four and twenty he quitted the profession of goldsmith, and became a painter. While employed in his father's workshop he had amused himself with taking the likenesses of all the persons he saw, so rapidly, and with so much liveliness and truth, as to astonish every one: the exact drawing and modelling of forms, the inventive fancy exercised in his mechanical art, and the turn for portraiture are displayed in all his subsequent productions. These were so many in number, so various in subject, and so admirable, that only a few of them can be noticed here. After he returned from Rome his first work was the painting of a chapel of the Vespucci family, in the church of Ognissanti (All Saints), in which he introduced, in 1485, the portrait of Amerigo Vespuccio the navigator, who afterwards gave his name to a new world.

Ghirlandajo painted a chapel for a certain Florentine citizen, Francesco Sassetti, in the church of the Trinità. Here he represented the whole life of Francesco's patron saint, St. Francis, in a series of pictures full of feeling and dramatic power. As he was confined to the popular histories and traditions, which had been treated again and again by successive painters, and in which it was necessary to conform to certain fixed and prescribed rules, it was difficult to introduce any variety in the conception. Yet he has done this simply by the mere force of expression. The most excellent of these frescoes is the Death of St. Francis, surrounded by the monks of his order, in which the aged heads, full of grief, awe, resignation, are depicted with wonderful skill: at the foot of the bier is an old bishop chanting the litanies, with spectacles on his nose, which is the earliest known representation of these implements, then recently invented. On one side of this picture is the kneeling figure of Francesco Sassetti, and on the other Madonna Nera, his wife. All these histories of St. Francis are engraved in Lasinio's 'Early Florentine Masters,' as are also the magnificent frescoes in the choir of Santa Maria Novella, his greatest work. This he undertook for a generous and public-spirited citizen of Florence, Giovanni Tornabuoni, who agreed to repair the choir at his own cost, and, moreover, to pay Ghirlandajo one thousand two hundred gold ducats for painting the walls in fresco, and to add two hundred more if he were well satisfied with the performance.

Ghirlandajo devoted four years to his task. He painted on the right-hand wall the History of St. John the Baptist, and, on the left, various incidents from the life of the Virgin. One of the most beautiful represents the Birth of the Virgin; female attendants, charming graceful figures, are aiding the mother or intent on the new-born child, while a lady, in the elegant costume of the Florentine ladies of that time, and holding a handkerchief in her hand, is seen advancing, as if to pay her visit of congratulation. This is the portrait of Ginevra de' Benci, one of the loveliest women of the time. He has introduced her again as one of the attendants in the Visit of the Virgin to St. Elizabeth. In the other pictures he has introduced the figures of Lorenzo de' Medici, Poliziano, Demetrio Greco, Marsilio Ficino, and other celebrated persons of whom there are notices in Roscoe's 'Life of Lorenzo de' Medici'), besides his own portrait and those of many other persons of that time.

The idea of crowding these sacred and mystical subjects with portraits of real persons and representations of familiar objects may seem, on first view, shocking to the taste, ridiculous anachronisms, and destructive of all solemnity and unity of feeling. Such, however, is not the case, but the reverse. In the first place the sacred and ideal personages are never portraits from nature, and are very loftily conceived in point of expression and significance. In the second place, the *real* personages introduced are seldom or never actors, merely attendants and spectators of events which may



[illegible] —From the Choir of Santa Maria Novella.

be conceived to belong to all time, and to have no especial locality; and they have so much dignity in their aspects, the costumes are so picturesque, and the grouping is so fine and imaginative, that only the coldest and most pedantic critic could wish them absent.

The group at the head of this Essay represents the Virgin with her female attendants about to ascend the steps which lead to the Temple, when her father and mother have dedicated her to the service of the Lord.

When Ghirlandajo had finished this grand series of pictures, his patron, Giovanni Tornabuoni, declared himself well pleased; but, at the same time, expressed a wish that Ghirlandajo would be content with the sum first stipulated, and forego the additional two hundred ducats. The high-minded painter, who esteemed glory and honour much more than riches, immediately withdrew his claim, saying that he cared far more to have satisfied his employer than for any amount of payment.

Besides his frescoes, Ghirlandajo painted many easel pictures in oil and in distemper. There is one of great beauty in the Louvre—the Visitation (1022), about four feet in height; but the subject he most frequently repeated was the Adoration of the Magi. In the Florence Gallery are two pictures of this subject: another of a circular form, which had been painted for the Tornabuoni family, was in the collection of Lucien Bonaparte. In the Munich Gallery there is one picture by Ghirlandajo, and in the Museum at Berlin there are six; one of them a beautiful portrait of a young girl of the Tornabuoni family, whom he has also introduced into his frescoes.

It may be said, on the whole, that the attention of Ghirlandajo was directed less to the delineation of form than to the expression of his heads and the imitation of life and nature as exhibited in feature and countenance. He also carried the mechanical and technical part of his art to a perfection it had not before attained. He was the best colourist in fresco who had yet appeared, and his colours have stood extremely well to this day.

Another characteristic which renders Ghirlandajo very interesting as an artist, was his diligent and progressive improvement; every successive production was better than the last. He was also an excellent worker in mosaic, which, from its durability, he used to call "*painting for eternity*."

To his rare and various accomplishments as an artist, Ghirlandajo added the most amiable qualities as a man—qualities which obtained him the love as well as the admiration of his fellow-citizens. He was, says Vasari, "the delight of the age in which he lived." He was still in the prime of life and in the full possession of conscious power,—so that he was heard to wish they would give him the walls all round the city to cover with frescoes,—when he was seized with sudden illness, and died, at the age of forty-four, to the infinite grief of his numerous scholars, by whom he was interred, with every demonstration of mournful respect, in the church of Santa Maria Novella, in the year 1494. His two brothers, Davide and Benedetto, were also painters, and assisted him in the execution of his great works; and his son Ridolfo Ghirlandajo became afterwards an excellent artist, but he belongs to a later period.

Ghirlandajo formed many scholars, among them was the great Michel Angelo. Contemporary with Ghirlandajo lived an artist, memorable for having aided with his instructions both Michel Angelo and Lionardo da Vinci. This was Andrea Verrocchio, who was a goldsmith and sculptor in marble and bronze, and also a painter, though in painting his works are few and little known. He is said to have been the first who took casts in plaster from life as aids in the study of form. In the collection of Miss Rogers, the sister of the poet, there is a portrait in profile, by Verrocchio, of a Florentine lady of rank, rather hard and severe in the execution and drawing, yet with a certain simple elegance—a look of high breeding—which is very striking.

JUDICIAL ASTROLOGY.

PART I.

Of all the arts of divination astrology is in its own nature the most elevated, and may be considered as one of the most splendid fictions that has ever been imposed on the credulity of mankind. And even the disbelief in astrology, which is now so generally prevalent in society, is rather to be considered as the effect of education, than a firm conviction of the mind resulting from investigation and inquiry. There are few persons who know anything more of astrology than that it is the pretended science of predicting future events by the configuration of the heavenly bodies. But though there are but few amongst the well-informed who believe in judicial astrology, yet there is a rather numerous class with sufficient credulity not only to admit, but to seek its predictions; and, it may be added, that even amongst the better instructed—amongst those who openly denounce every species of divination—there are to be found minds prone to the secret admission of sidereal influence and presages. This latent belief is frequently evolved, and made manifest to others, by little superstitious acts and observances, of which the performers themselves are scarcely conscious.

It has been observed by Dugald Stewart, that the bias of the mind, undoubtedly, is to think favourably of the future: to overvalue the chances of possible good, and to underrate the risks of possible evil. This proneness of our nature displays itself very strongly in minds that are frequently in that state of desire to which the term hope has been given. Such persons are constantly believing that fortune has some of her gifts in store for them, and they are consequently anxious to learn when her bounties will be bestowed.

This tendency of the mind has induced men of all ranks and degrees, and of every age and country—whether savage or civilized—to endeavour to penetrate into futurity. The desire to become acquainted with the supposed good that is in store for us is as prevalent now as in the darkest ages of ignorance and superstition. Philosophers have shown the impossibility of this desire being gratified; theologians have demonstrated its criminality; poets have ridiculed it—

> "A trivial jest
> 'Tis for a man of your repute and note
> To credit fortune-tellers; a petty rogue,
> That never saw five shillings in a heap,
> Will take upon him to divine men's fate,
> Yet never knows himself shall die a beggar,
> Or be hanged up for pilfering table-cloths,
> Shirts, and smocks, hanged out to dry on hedges;
> 'Tis merely base to trust them"

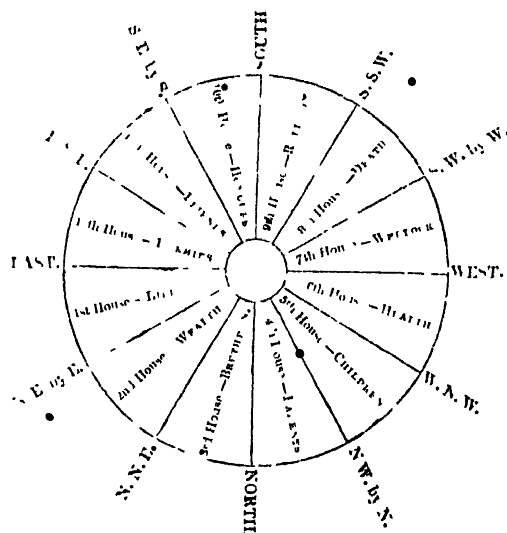
says Lodowick Barry, in 1611, in his 'Ram Alley, or Merry Tricks.' Yet the practice, we fear, has fluctuated rather than decreased. With regard to astrology, attempts are now being made to restore, in some degree, the dilapidations that have been made in the old fabric. In addition to the old astrological almanacs of Partridge, Francis Moore, and Vincent Wing, we have a new one under the startling title of '*Zadkiel's Almanack.*' We have also 'Zadkiel's Tables for the Calculation of Nativities,' and 'Zadkiel's Legacy,' in which is given a royal horoscope, and predictions for two hundred years

to come. To these may be added 'Raphael's Prophetic Messenger,' and 'Raphael's Library of Occult Science.' It has been observed, however, by the Abbé Pluche, that an exposition of astrology is its best refutation; and as we entertain the same opinion, we shall proceed to develop the principles and practice of the art.

The first thing to be explained is the division of the celestial sphere into what is technically termed the twelve houses of heaven. These houses are not to be confounded with the twelve signs of the zodiac, which are the houses of the planets.

The twelve divisions of the sphere must be considered as being fixed, while the constellations and the planets revolve through them in twenty-four hours. The *first* house is in the eastern horizon, the *fourth* in the nadir, the *seventh* in the western horizon, and the *tenth* in the zenith; thus occupying the four cardinal points. These four houses are of the greatest importance, and, in the celestial scheme, are called the angles of the figure. Those that immediately follow these prime angles are, called *succedants*, or succedant houses, and the next to these are called *cadent* or falling houses.

The boundary-lines which separate one house from another are called the cusps of the houses. Thus the boundary which separates the first from the twelfth house is called the cusp of the first house, and that sign of the zodiac which is ascending above this line is called the ascendant, or emphatically the horoscope.



In the above diagram we have made the cusp of the first house to coincide with the horizon, while others place it five degrees above; but as this, as well as the manner of dividing the sphere, is a disputed point, we shall say, with Cowley

> "So near the truth will serve our turn as well;"

especially as we have the majority on our side.

These twelve houses, it is seen, are distinguished by appellations which designate their respective properties, and the heavenly bodies, as they pass through them in the twenty-four hours, have their natures and power modified accordingly. The merely arbitrary and reasonless appropriation of the names to the places at once settles the character of the pretended science. We shall give, however, a specimen of the jargon of the art.

House the First, or Ascendant.—This is the house of life, and it is from the constellation and the planets that may be posited in this house at the time of any person's nativity, that personal character, natural disposition, and mental qualifications are derived. The planet which rules the sign ascending in this house is called the lord of the ascendant, and is the *signification* of the native. The other houses are characterized in a similar manner, and all the incidents of human life are originated in the twelve houses of the sphere.

We shall now proceed to the consideration of the twelve signs of the zodiac.

The names, order, and characters of the twelve signs into which the zodiac is divided, are:—Aries ♈, the Ram; Taurus ♉, the Bull; Gemini ♊, the Twins; Cancer ♋, the Crab; Leo ♌, the Lion; Virgo ♍, the Virgin; Libra ♎, the Balances; Scorpio ♏, the Scorpion; Sagittarius ♐, the Archer; Capricornus ♑, the Goat; Aquarius ♒, the Water-pourer; and Pisces ♓, the Fishes.

These signs are divided by astrologers into four trigons, or triplicities, called the fiery, the airy, the earthy, and the watery, according to the old notion of the four elements. The fiery signs are, ♈, ♌, ♐; the airy, ♊, ♎, ♒; the earthy, ♉, ♍, ♑; and the watery, ♋, ♏, ♓.

According to Manilius, the Roman astrological poet, some signs govern the water, others the land:

> "Some signs, 'tis obvious, do the sea command,
> And others claim dominion o'er the land:
> Thus wat'ry *Pisces* and the *Crab* retain
> Their proper nature both, and rule the main;
> The *Bull* and *Ram* possess their old command,
> They lead the herds, and still they love the land."

These twelve signs have great power and influence. They not only govern kingdoms, provinces, and cities, but also localities of every description. Various diseases are under their influence, as well as the different parts of the human body: and hence we have the "back, belly, legs, and feet" which form an interesting column in 'Moore's Almanac,' published by one of the principal companies of the City of London. But one of the most important circumstances connected with these divisions of the zodiac is their being constituted the mansions, or, as they are technically termed, the *houses* of the planets. To these we shall have occasion to advert when describing planetary influence.

The description of the twelve signs given by William Lilly, the most famous of our English astrologers, is in many respects curious. We shall not go the whole round of the circle, but give two or three instances; in all of which will be noticed the wholly groundless assumptions on which the science (as it is falsely called) rests.

To begin with the first, Aries ♈, or the Ram. After describing the fiery nature of the sign, Lilly proceeds to enumerate the personal endowments it bestows, the countries and cities it governs, and the minor localities of which it is the indicator. These latter are given under the head "*Places*."—"Where sheep and small cattle feed; high and sandy ground; private and unfrequented places in houses; the top covering or ceiling of houses, and the east part thereof."

The "*Places*" of Leo ♌, the Lion, are, "forests, woods, desert places, steep rocks, forts, castles, kings' palaces, and in houses the *chimney*, or places where fire is kept." Now as the assignment of the roof of the house to the Ram, and the chimney to the Lion, may appear very extraordinary, if not absurd, it may be necessary to observe, that although the relation of connection between the roof and the Ram, and the chimney and the Lion, may not immediately suggest itself to the mind, yet when it is recollected that treasures may be hidden or stolen property concealed in these strange and secret places, and that it is the business of astrology to discover these depositories, we may readily admit, that as some one or other of the signs may indicate the locality, it is as reasonable to assign the roof

to the Ram, and the chimney to the Lion, as to the Bull, the Crab, the Virgin, or the Fishes.

We shall now give a specimen or two, from the same authority (Lilly), of the influence possessed by the signs in giving personal character and appearance to man:—

"Capricornus ♑, the Goat, gives a person of an indifferent stature, not very tall; his body is dry and spare; his visage long, lean, and slender; his chin is long and narrow; his beard (if he have any) is very thin; his hair black or dark brown; the neck long and thin, and the chest narrow."

Saturn, the lord of the house, bestows, according to Blagrave, a personal form and appearance that agree, in some respects, with what Lilly ascribes to the sign. "Saturn gives a person of a middle stature, with a swarthy, pale, and muddy complexion, little eyes, unpleasant down-cast look, lowering eyebrows, broad forehead, flat nose, and thick lips; he goes with his head stooping, and with his feet shovelling; he hath great lop-ears, black, lank, greasy, or shining hair, thin beard, spare body, and is every way a heavy, unpleasing, peevish, melancholy, and lumpish person: *this of himself*. But you must mix his or any other planet's significations, according as they are conjoined with others." Saturn, in his other house—Aquarius ♒, the Water-pourer—"gives a full-bodied person, of the middle stature, inclined to corpulency, a clear complexion, brown hair, and a graceful deportment; he is affable, courteous, of an excellent prying fancy, and a proficient in what he undertakes in sciences and arts, but subject to be conceited, yet a person of a pregnant genius."

Here it may be observed that the abstract or elementary power given by Lilly to the signs, and by Blagrave to the planets, as it is never exercised simply or alone, being always combined with and tempered by other influences, could only be known to the professors of astrology by inspiration, for that which never makes itself manifest under any circumstances can never be discovered by observation. And it may be further remarked, that the early astrologers, in assigning power to the constellations, seem to have imagined that their names were indications of their several offices and specifications of their influence.

We proceed to the asserted nature, power, and influence of the planets.

The names and characters of the seven old planets are, Saturn ♄, by nature cold, dry, and melancholy; Jupiter ♃, hot, moist, and temperate; Mars ♂, hot, dry, and choleric; Sol ☉, hot, dry, and temperate; Venus ♀, cold, moist, and phlegmatic; Mercury ☿, cold, dry, and variable; Luna ☽, cold, moist, and phlegmatic. These seven planets are all that can be considered as belonging to astrology; Uranus ♅, Ceres ⚳, Pallas ⚴, Juno ⚵, and Vesta ⚶, not having been discovered till after the year 1780.

Saturn is the most cruel and malignant of all the planets, and on that account is termed the greater infortune. The opinion respecting his cruelty most probably arose from the circumstance of his having been made the emblem of time, which may be considered as cutting down and devouring its own offspring. The malign nature of Saturn is so well shown by Dryden (himself a believer in astrology), that any prose account of it would be comparatively feeble. Saturn, speaking in his own person, says—

"Man feels me when I press th' etherial plains,
My hand is heavy, and the wound remains.
Mine is the shipwreck in a *wat'ry sign*,
And in an *earthy* the dark dungeon mine;
Cold shiv'ring agues, melancholy care,
And bitter blasting winds, and poison'd air,
And wilful death resulting from despair.
The throttling quinsey 'tis my star appoints,
And rheumatisms I send to rack the joints.
Mine is the privy pois'ning: I command
Unkindly seasons, and ungrateful land;
My looking is the sire of pestilence
That sweeps at once the people and the prince."

The planets, besides being the special significators of those who are born when the constellation which constitutes their house is rising, are the general significators of various kinds of persons and professions. They have also dominion over plants and herbs, and are the indicators of different diseases. The kinds of persons and professions denoted by Saturn are ancient people in general, husbandmen, day-labourers, beggars, plumbers, colliers, scavengers, miners, sextons, monks, and sectaries.

The next planet in astrological order is Jupiter, the most exalted in benignity of the astral heptarchy. He is called, on account of his beneficence, the *greater fortune*, and is the causator of justice, honour, mercy, moderation, sobriety, temperance, and magnanimity. "He denotes a tall handsome person, a ruddy complexion, an oval face, high and large forehead, grey eyes, soft auburn or chestnut-coloured hair, and much beard."

Under the patronage of Jupiter are kings, princes, nobles, judges, senators, bishops, clergymen, and civilians. The oak is under the dominion of Jupiter.

The third in order, but second in malignity, is Mars:—

"Mad furious pow'r, whose unrelenting mind
No god can govern and no justice bind."

It is useless, however, to go through all the planets, enumerating the absurd appropriations that are made to each—of emperors, kings, coppersmiths, and pewterers to the sun; of painters, players, cowslips, and daisies to Venus; of philosophers, astrologers, printers, and tailors to Mercury. All of them appear to have been derived from some fancied approximation to poetical descriptions, or to the old mythological characters given to the deities after which the planets had been named. Not the slightest attempt seems to have been made to found any of the principles of the art on observation of facts; it was probably felt that any such proceeding would destroy it. As a specimen we give the astrological character of Luna, or the Moon, just remarking that "round pale faces," "light grey eyes," and "light-brown hair," seem more characteristic of climate than a "well dignified" moon.

This beautiful luminary—

"Queen of the mournful night,
With thousand stars attending on her train,
Cheering mankind with lustre not her own,"

is so susceptible of the influence of the other plants, and so frequently changed in her disposition by being in their vicinity, that she can scarcely be said to possess any decided character. However, when she is well dignified, "she gives a person somewhat above the middle stature, a round pale face, light grey eyes, commonly unequal, light brown hair, the body plump, corpulent, and phlegmatic, and short fleshy hands and fingers. If ill dignified, the person proves to be a vagabond or lazy idle companion, given to sottishness and delighting in living carelessly and beggarly, a mutable, unsettled, inconstant person." She is the patroness of queens, duchesses, and ladies. She is also the significator of travellers, pilgrims, sailors, fishermen, vintners, coachmen, watermen, and charwomen. She governs white roses and the willow-tree, and, according to Hudibras—

"Rules all the sea and half the land,
And over moist and crazy brains,
In high spring-tides, at midnight reigns."

[To be continued.]



[Sir Roger de Coverley and the Gipsies.]

SIR ROGER DE COVERLEY.

No. VII.

At the time when Addison described the race of fortune-telling gipsies for the edification of the London public, there were few travellers for amusement, and fewer who left the din and smoke of the town to wander through commons and green lanes, the gipsies' haunts. It is remarkable how little change is to be observed in the manners of the vagrant tribe. Addison's description might have been written yesterday. "As I was yesterday riding out in the fields with my friend Sir Roger, we saw at a little distance from us a troop of gipsies. Upon the first discovery of them, my friend was in some doubt whether he should not exert the Justice of the Peace upon such a band of lawless vagrants; but not having his clerk with him, who is a necessary counsellor on these occasions, and fearing that his poultry might fare the worse for it, he let the thought drop: but at the same time gave me a particular account of the mischiefs they do in the country, in stealing people's goods and spoiling their servants. If a stray piece of linen hangs upon an hedge, says Sir Roger, they are sure to have it; if the hog loses his way in the field, it is ten to one but he becomes their prey; our geese cannot live in peace for them; if a man prosecutes them with severity, his hen-roost is sure to pay for it; they generally straggle into these parts about this time of the year, and set the heads of our servant-maids so agog for husbands, that we do not expect to have any business done as it should be whilst they are in the country. I have an honest dairy-maid who

crosses their hands with a piece of silver every summer, and never fails being promised the handsomest young fellow in the parish for her pains. Your friend the butler has been fool enough to be seduced by them; and, though he is sure to lose a knife, a fork, or a spoon every time his fortune is told him, generally shuts himself up in the pantry with an old gipsy for above half an hour once in a twelvemonth. Sweethearts are the things they live upon, which they bestow very plentifully upon all those that apply themselves to them. You see now and then some handsome young jades among them: the sluts have very often white teeth and black eyes.

"Sir Roger observing that I listened with great attention to his account of a people who were so entirely new to me, told me, that if I would, they should tell us our fortunes. As I was very well pleased with the knight's proposal, we rid up and communicated our hands to them. A Cassandra of the crew, after having examined my lines very diligently, told me, that I loved a pretty maid in a corner, with some other particulars which I do not think proper to relate. My friend Sir Roger alighted from his horse, and exposing his palm to two or three that stood by him, they crumpled it into all shapes, and diligently scanned every wrinkle that could be made in it; when one of them, who was older and more sun-burnt than the rest, told him, that he had a widow in his line of life: upon which the knight cried, Go, go, you are an idle baggage; and at the same time smiled upon me. The gipsy, finding he was not displeased in his heart, told him, after a farther inquiry into his hand, that his true-love was constant, and that she should dream of him to-night: my old friend cried Pish, and bid her go on. The gipsy told him that he was a bachelor, but would not be so long; and that he was dearer to somebody than he thought: the knight still repeated, she was an idle baggage, and bid her go on. Ah, master, says the gipsy, that roguish leer of yours makes a pretty woman's heart ache: you have not that simper about the mouth for nothing. The uncouth gibberish with which all this was uttered, like the darkness of an oracle, made us the more attentive to it. To be short, the knight left the money with her that he had crossed her hand with, and got up again on his horse.

"As we were riding away, Sir Roger told me, that he knew several sensible people who believed these gipsies now and then foretold very strange things; and for half an hour together appeared more jocund than ordinary. In the height of his good humour, meeting a common beggar upon the road, who was no conjurer, as he went to relieve him he found his pocket was picked: that being a kind of palmistry at which this race of vermin are very dexterous."

PRODUCTS OF THE POTATO.

THERE are few circumstances connected with the chemistry of vegetable substances more remarkable than the production of three or four apparently very different bodies from the same plant. That the *potato* yields a nutritious and highly-valued article of food as a table vegetable, is well known; yet it may seem strange to many that the dry substance *starch* can be procured from it; and still more strange that *sugar* can be extracted from it; and, perhaps, most strange of all, that it can be made to yield *alcohol*, or *spirit*. All this is, however, strictly true; and there are many vegetable substances, beside the potato, of which the same may be said.

Starch, whether it be procured from one or another vegetable substance, is a whitish powder, composed of very minute globules or spheroids. It is obtained from wheat, rye, barley, oats, buckwheat, rice, maize, millet, and other kinds of grain; from peas, beans, lentiles, &c.; and from such vegetables as potato, manioc, and arrow-root. The following will give an idea of the mode of procuring it from potatoes.

The potatoes are first washed in a cylindrical cage formed of wooden spars, made to revolve upon a horizontal axis in a trough filled with water. When thus washed, the potatoes are reduced to a pulp by means of a kind of rasping-machine. This machine consists of a wooden cylinder covered with sheet-iron, and roughened on the outer surface by numerous prominences, the result of punching holes from the inner side. This cylinder is inclosed in a square wooden box, and is turned by a winch. The potatoes are put into a vessel placed over the cylinder, in the roughened surface of which they rest; and by the rotation of the cylinder the potatoes become scraped to pieces, the fragments falling down to the bottom of the box in which the cylinder is enclosed. The potato-pulp falls into a chest or trough at the bottom, from which it is easily removed. With such a machine as this, three men are said to be able to rasp two tons and a half or three tons of potatoes in twelve hours. The potato-pulp is then placed upon a fine wire or hair sieve, which is set upon a frame in the mouth of a large vat, where water is made to flow upon it from a spout with many jets. While the water is so flowing, the pulp is worked about until everything has penetrated through the sieve, except the stringy or fibrous particles. The water, turbid with the fine pulp thus mixed with it, is allowed to settle for some time, and all the water is then poured off from the sediment: as the water poured off, however, still contains some of the pulp suspended in it, it is allowed again to settle, and the sediment separated from it; and so on three or four times, until all the pulp has been separated from the water. This extremely fine pulp is the potato starch; and it is either dried to the state of a powder, or preserved in the moist state, according to the purposes to which it is to be applied.

Out of every hundred parts in weight of potato, there are on an average about fourteen of starch; the remaining solids, consisting of fibre, vegetable albumen, gum, sugar, and salts, averaging about twelve parts; and water forming the remainder, or three-fourths of the whole.

A writer on the culture of the potato, while speaking of its starch, says, "The farina of the potato, properly granulated and dried, is sold in our shops as tapioca, to which it bears the closest resemblance both in appearance and in essential properties. For confectionary the flour is so delicately white, and it is so digestible and nutritious, that it ought to be in more general use among the children of the poor, especially in the winter season, when they so rarely enjoy the luxury of milk; and the cost is not more than a sixth or seventh of the price of tapioca or arrow-root, if it be made at home. Few housewives are ignorant of the method of obtaining it by the use of the common hand-grater and sieve; but for yielding larger supplies some machinery is necessary."

In agricultural works relating to Ireland the importance of potato-starch, or farina, is dwelt upon more pointedly than in England, in obvious connection with the extensive use of the potato in the former country. Thus Martin Doyle says:—"The starch of the potato—for the term farina is scarcely correct, as it is deficient in the *gluten* which flour possesses—is an excellent substitute for arrow-root or tapioca, and with sugar or salt is admirably suited to the nourishment of the young children of the poor, and to the stomachs of persons of debilitated digestive organs. In winter, when milk is scarce, it is truly valuable, yet little used; when wheat is dear, and potatoes are cheap in

comparison, a thrifty housekeeper will find it good economy to grate the potatoes, after a perfect cleansing, and extract the starch, either for cakes or puddings, or for the laundress."

Again, Mr. Poole, secretary to the Agricultural Society of Ireland, in a paper communicated to the 'Irish Farmers' Magazine,' makes the following remarks on the conversion of potato-starch into wholesome food:—"Flour and meal from grain contain, in addition to their nutritious qualities, certain other ingredients, which serve to give adhesiveness and a kind of mechanical structure to the dough. The potato-flour possesses only the nutritive principle, and is deficient in the others; hence its mechanical unfitness to be converted into light or spongy bread. In a pure state, some extremely palatable cakes have, however, been made of it in our house, with no other addition than that of a little salt. By adding about one-fifth of its weight of wheaten meal, and a very minute portion of butter, to render it short and brittle, we have had a quality of bread which was preferred by nearly all the family to Manders's sweet and wholesome loaves. To soups and broths we have found it a valuable addition; and that cheap and excellent puddings may be made from Irish tapioca there can be no doubt."

In France potato-flour forms an exceedingly valuable food in the French marine, where, with the addition of a portion of wheaten flour, it is converted into biscuits, pastry, soups, gruel, &c. Considerable quantities are also manufactured into a kind of paste, of which one pound is equal to a pound and a half of rice, to a pound and three-quarters of vermicelli, or to eight pounds of potatoes. More than a hundred thousand tons of potatoes are said to be annually manufactured into potato-flour in the city and vicinity of Paris. Besides the flour, too, the French prepare "granulated" potato, which is described as being highly nutritious, and which is thus prepared:—The potatoes, after being washed, are exposed to boiling water just long enough to enable them to be peeled conveniently, but without depriving them of their crispness. They are then put into a tall cylinder, whose curved surface is perforated with holes about large enough to allow grains of rice to pass through. A piston, fitted into the cylinder, is then forcibly pressed down upon the potatoes, which are thereby crushed into a pulp, and the pulp is forced through the holes in a continuous string like vermicelli. In the act of falling into a tin dish beneath, these strings break into little bits about the size of grains of rice. These grains, after being sifted to bring them all nearly to one size, are taken to a room heated to 85° or 90° Fahr., where they lie exposed to the heat, being gently stirred from time to time. The whole of the moisture being thus evaporated, the potato presents the form of a compact, hard, brittle, semi-transparent grain, somewhat resembling rice, and yielding a very fragrant odour. This grain may be packed in bags or boxes, and kept for many years uninjured; and, when wanted, may be used in the same manner as rice or maccaroni or pearl-barley, in any of the ways in which those substances are commonly used.

Cheese is, in Germany, thus made from potatoes. Large and fine potatoes are boiled, then peeled, and beaten to a fine smooth paste in a mortar, with a wooden pestle. From this paste three or four different kinds of cheese are made, differing in richness; of which the cheapest will serve to illustrate the character. Five pounds of the paste are put into a cheese-tub, with one pound of milk and rennet; to which are added a little salt, caraways, and cummin-seed, to impart flavour. All these ingredients are well kneaded together, covered up, and suffered to remain three or four days. At the expiration of this time they are again kneaded, the paste put into wicker moulds, and the cheeses left to drain until quite dry. When dry and firm, they are laid on a board, and left gradually to acquire hardness in a place of very moderate warmth. When these cheeses are thoroughly dry and hard, they are placed in barrels with green chickweed between them, where they remain about three weeks, when they become fit for use.

We may next glance at the production of *sugar* from potatoes. Dr. Ure, in a paper published a year or two ago, in the 'London Journal of Arts,' remarks:—"It is only within two years that sugar has been made in this country from potato-starch to any extent, although it has been long an object of commercial enterprise in France, Belgium, and Holland, where the large coarse potatoes are used for this purpose. The raw material must be very cheap there, as well as labour; for potato flour or starch, for conversion into sugar, has been imported from the Continent into this country in large quantities, and sold in London at the low price of 16s. per cwt." Dr. Ure then states the mode of proceeding to obtain sugar from potato to be nearly as follows:—One hundred gallons of boiling water are mixed with a hundred and twelve pounds of potato starch (for the starch is obtained from the potato as a preliminary to the extraction of the sugar), and two pounds of the strongest sulphuric acid. This mixture is boiled about twelve hours in a large vat made of white deal, having pipes laid along its bottom for containing steam. After this boiling, the acid liquor is neutralized with chalk, filtered, and then evaporated to the density of about 1·300 at the boiling temperature. After this syrup has been left still for several days, it concretes into crystalline tufts, and forms an apparently dry solid. When the syrup is exposed to a heat of 220°, it fuses into a liquid, nearly as thin as water; and on again being cooled to 150°, it takes the consistence of honey, and at 100° that of a viscid varnish. It must be left a considerable time at rest before it recovers its granular state. The sweetening power of potato-sugar is said to be about two-fifths that of cane-sugar.

Another product of the potato, viz. *spirit*, though not much known in that form in England, is known in some other countries. Mr. Laing, in his 'Residence in Norway,' has the following paragraph:—"I went to see the process of distilling brandy from potatoes in a small work at Drontheim. The potatoes are first washed quite clean, then steamed, and crushed between two cylinders. They are then in the state of pulp or soup; which is run off into vats to ferment along with a small proportion of malt. I found that in eight barrels of potatoes, equal to four imperial quarters, they used in this distillery two 'vogs,' equal to seventy-two pounds weight, of good malt. The fermentation requires generally three days, and is produced by yeast: the process then goes on as in our stills. The produce from this quantity of potatoes and malt varies much, according to the quality of the former. From eight to twelve and even sixteen pots, each pot four-fifteenths of a gallon, is the usual return from one ton or barrel, viz., half a quarter of potatoes. Every farmer is entitled to distil the produce of his own farm; and pays a trifling licence duty, if he buys potatoes, and distils as a trader. A still is kept on every farm, not merely for the sake of the spirits, of which the consumption in a family is very great, but for the refuse or wash for the cattle. The spirit is distilled twice for the use of the family, and flavoured with aniseed. It is strong and fiery, but not harsh or ill tasted. What has been only once distilled has not so raw and unpleasant a taste as new whiskey. The Norwegian gentry seem to prefer it as a dram, when twice distilled, to Cognac brandy. I never saw it

mixed with water." There are distilleries for this purpose in Berlin also, and in other towns of Northern Germany.

Dr Ure, in his 'Dictionary of Arts,' goes into the details of the method by which spirit is distilled from potatoes on a large scale in certain localities where the potatoes abound at a moderate price. He states that one hundred pounds of potatoes yield from eighteen to twenty pounds measure of spirits, nine-elevenths of our excise-proof, or about sixteen pounds measure of proof, or a gallon and two-thirds. After the month of December potatoes begin to yield a smaller product of fermented spirit, and when they have once sprouted or germinated, they afford very little indeed. The cost of transporting and the difficulty of keeping potatoes is one reason why this species of distillation is not carried on to much extent in England.



[Langdale Peasant.]

LANGDALE, WESTMORELAND.

[Concluded from page 350.]

IN our paper on the Duddon we said that Wrynose Fell, on which the Duddon rises, should be ascended from Langdale; the ascent may be as conveniently made from this place as anywhere. But it is not in that direction that our course now lies. Leaving this spot, we will cross over at once to the Langdale Pikes, which the tourist should by all means ascend, both for the fine view from the summit and for the rough climb necessary to obtain it. The ascent should be made from Millbeck, following the little stream that dashes down the mountain from Stickle Tarn, and passing a pretty little waterfall. The tarn, with the savage crags which overhang it, is a fine object. In order to gain the top of the pikes, leave the tarn on the right, and with some rather rough climbing the summit will be in no long time reached. The view will amply repay the labour of the ascent, that is, if the pikes be clear of clouds—rather an unusual occurrence. On the side of the mountain about a mile from Millbeck, in a deep cleft, is Dungeon Ghyll Force, one of the most singular of those forces (or waterfalls) so common on the mountain sides. It has been thus described by Wordsworth in his poem of the 'Idle Shepherd Boys:'—

> "Into a chasm a mighty block
> Hath fallen and made a bridge of rock;
> The gulf is deep below,
> And in a basin black and small,
> Receives a lofty waterfall."

It is this "mighty block" that principally renders this force so remarkable as it is generally admitted to be. The fall itself is neither so lofty nor striking as Scale Force by Crummock Lake, and in body of water it is inferior to many, yet few visit it on whom it does not produce a stronger impression than almost any other in these parts. You make your way to it along a little brawling brook, and among lumps of mossy crag that have fallen from above, up a narrow, dark cleft, and the high beetling crags, the strange position of the hanging mass, which in the twilight appears 'nodding to its fall,' with the roar of the water, give an importance to the force hardly due to its size. Seen just as night is creeping on, it is almost sublime.

There are two more of these forces in Little Langdale—Colwith and Skelwith Forces—which have been quite sufficiently praised: they are hardly worth going out of the way to visit.



[Dungeon Gill.]

While we are speaking of Little Langdale we may as well just notice its tarn, an agreeable object in the landscape, but not in itself in any way remarkable. Langdale is rich in these miniature lakes and they are very various, and some very beautiful. Besides those we have named, there are, in Great Langdale, Elter Water and Loughrigg Tarn, the latter perhaps the loveliest in these parts. Surrounded by well cultivated fields and gentle slopes covered with fresh green verdure, its banks enlivened by a few straggling cottages, with trees of picturesque forms reflected in softer colours in the clear still water, the shores studded with brilliant flowers, and much of the surface decked with aquatic plants—it forms a perfect contrast to the naked grandeur of Blea Tarn. It is an image of pastoral beauty, as Blea Tarn with its adjuncts is of stern solitude.

The visitor who passes along Langdale from its head by Loughrigg Tarn will be greatly struck by the change that occurs in the character of the scenery in his progress towards its other extremity. At starting he sees around him a rich and picturesque succession of fertile pasture-land with flourishing hazel coppices, and a plentiful sprinkling of oak and birch, gentle elevations covered with fresh verdure, and a brook that "all *day* singeth a quiet tune;" but as the valley is ascended, the mountains become more rugged, the verdure scarcer, instead of hedgerows, he sees loose stone walls, and the very brook is ruder and noisier. And this increases until he finds himself in one of the wildest parts of the district, among mountains of the most magnificent description, and his way barred up, except by one of the finest passes hereabouts. This, as we have said, is Stake Pass, and the visitor should go over it into Borrowdale; there is some noble scenery about it, and some fine views from the higher ground on either side. If not pressed for time, the pedestrian should deviate a little to climb awhile about the fells on the sides of this pass, the mountains around are seen to great advantage from them, and the solitary rambler will often feel himself to be literally shut out from all the world as he looks around him in some savage nook.

We ought to call the attention of the visitor to the influence of light and shadow in these mountain vales. It has often been pointed out, but is seldom observed, except by artists. Yet few things tend more to produce those striking changes in the appearance of mountain scenery, which so greatly increases the pleasure it never fails to excite. Not alone does the different position of the sun at various hours of the day effect this, but scarce a cloud traverses the vale without altering the aspect of some mountain ridge. He who has not observed it among the mountains cannot fully understand the power of light and shadow. Langdale, from the form of the valley, the arrangement of the mountain groups, and their massive yet broken character, is peculiarly adapted for such a study. As we hinted above, too, the atmospheric effects on the mountains are here very observable. Langdale Pikes are seldom clear of clouds, when clouds are anywhere about, and it is curious to watch them sometimes break upon its jagged summit and crumble away, as others calmly rest like a coronet upon it or envelop it entirely.

The vale, as we have already observed, is dotted over with small farm houses and cottages; our engraving of the "solitary farm-house" will give an idea of their structure. In our paper on the Duddon we spoke somewhat of the inhabitants of Donnerdale, and what we said of them will apply with some difference to those of Langdale. Of course, as these are not so secluded as the former, there are not quite so many

old habits lingering about them, nor is there so much simplicity of manners. The men are sober, intelligent, industrious, and hardy. They are not to be seen much in the daytime, as they are generally about the fells or in the quarries, being mostly shepherds or quarry-men. The fairer portion are many of them very pretty when young, but the practice of working so much in the fields—and much of what is considered only the labour of men in the southern counties is performed by them—renders them more than usually hard-favoured when of a certain age. Our drawing at the head of this paper will serve to show their ordinary costume, though it is but fair to say that the elderly lady in a man's hat by no means approved of her likeness being taken: her young friend did not seem to have so strong an objection. The old dame's dress—we set it down for the gratification of our fair readers—consisted of an old battered white (man's) hat with a cap beneath, a blue cotton jacket, white apron, and brown petticoat, with a pair of thick wooden-soled shoes, or clogs, as they call them. These clogs are worn, by the way, by all, down to the children who can only just trot about, and, as may be guessed, in doors they make no small clatter on the stone floors, especially as the prudent parents are careful to have them somewhat too large against their feet grow.

Wordsworth's descriptions and notices of the peasantry of this district appear to us very true, and evidently the result of close observation. He, as a native, has perhaps a little natural partiality for them; yet few who have observed our English peasantry in opposite parts of the island—with all their faults and more excellencies, a noble race of men—will fail to rank our mountaineers higher than the average: they are manly and independent, and possess much of those twin virtues—whose absence we are sometimes disposed to think the most prominent defect of our countrymen—forethought and self-denial.

THE MAREMMA AND PONTINE MARSHES OF ITALY.

ENGLISHMEN who have not visited Italy, and who are accustomed, from the perusal of works relating to the natural and artistic beauties of that country, to associate with it nothing but ideas of loveliness and salubrity, are scarcely aware that there is a tract of land, stretching along the western coast through the territories of Tuscany, Rome, and Naples, so flat, swampy, and unhealthy, as to have defied all attempts to render it a district fit for habitation and cultivation.

With a map of Italy before us, we may trace the relation which this tract of land bears to the rest of Italy. The Apennines run like a central core down Italy from north to south, or rather from north-west to south-east, about midway between the two opposite coasts; and between these mountains and the western coast, opposite Elba and Corsica, is a flat district which in many parts presents the unhealthy character here alluded to. This low land, which is called *maremma* by the Italians, or a sea-side district, consists of a volcanic soil covered in many parts by the alluvions of the Tiber and other rivers, and by the decomposition of rank vegetable matter. There are offshoots from the Apennines, stretching nearly to the coast, which intersect this low region at two or three points, and furnish elevated and healthy spots for habitations: indeed the City of Rome itself is built on a small group of such hills. The lowland district, thus divided by hills into two or three portions, obtains different names: thus in Tuscany the general name *maremma* (or, in the plural, *maremme*) is employed; in the Pontifical States the low district is termed the *Campagna di Roma*; while the southern termination of this Campagna forms the *Pontine Marshes*, the most unhealthy of the whole.

The maremme stretch like a broad belt along the coast of the Mediterranean, seldom extending deeper than five and twenty miles inland, and in several points considerably less. The portion of the maremme forming the Campagna has been estimated at 112,909 *rubbie* (a rubbio being an Italian land-measure equal to about four English acres), or nearly a thousand square miles. Two-fifths of the Campagna are the property of convents and other ecclesiastical establishments; while the remaining three-fifths are owned by about a hundred lay proprietors.

The whole of this district is more or less unhealthy, being affected with a *mal aria*, or tainted state of the atmosphere. Much conjecture has been hazarded respecting the cause of this mal'aria; but it seems pretty certain that the effect is produced partly from the stagnant waters and the decomposition of vegetable matter, and partly from the nature of the soil. The position of the Roman plain, between the sea and the Apennines, exposes it to sudden alternations of southern hot winds and northern cold blasts from the mountains. The proximity of the sea, and the lakes and marshes, create abundant moisture; and the clouds, being stopped by the Apennines, resolve themselves into copious rain. The extreme heat of the summer's day is often succeeded, if the wind is from the mountains, by a sudden chillness after sunset, when the vapours become condensed into dew; exposure to the evening air is then dangerous, and often fatal. If the wind is from the south, or what in Italy is called a *sirocco*, the air becomes suffocating, the perspiration profuse and incessant, and the nights are as sultry as the days; by which the body becomes weakened and rendered incapable of exertion. Again, the Mediterranean, being almost a tideless sea, does not afford the means of refreshing and renovating the air of the plains which border the coast, and of clearing the waters of the rivers; a process which in other places renders such important aid to the salubrity of the air. Besides all this, it is supposed that the district owes much of its insalubrity to the nature of the soil, which is of volcanic formation, containing a vast number of hydro-sulphurous or hydro-carbonic springs; this soil, acted on by the rays of the sun, gives off large quantities of deleterious gas, which injuriously affect the atmosphere.

M. Tournon, who was Prefect of Rome during the French occupation from 1810 to 1814, has very graphically shown the difference between the hilly and the flat portion of the Campagna in respect to agriculture and productive industry. In the hilly region, all is life, bustle, and prosperity; the ground is covered successively by various productions; numerous trees spread a cool shade around; the dwellings of the husbandmen, scattered along the gentle slopes, appear in the centre of gardens and orchards; and various manufacturing establishments are seen here and there. In the plain below, on the contrary, solitude reigns; the ground, rising in slight hillocks, or depressed into hollows, discloses at intervals grey or reddish rocks, bared by the action of violent rains; no trees are to be seen; and the few inhabitants live huddled together in gloomy villages, few and far between, from whence they sally out to the works of the distant fields. The eye discovers for many miles no cottage, farm-house, or barn; nor does the ear detect the barking of dogs or the crowing of the cock. It is true that during winter and the early part of spring the fields are decked with spontaneous vegetation, which furnishes pasturage for numerous herds of cattle and flocks of sheep: but as soon as the hot season arrives a sudden change takes place in the ap-

pearance of the country; all vegetation ceases; first a yellow, then a grey tinge covers the ground; the dusty soil looks as if calcined by fire; the cattle migrate to the hills; and the inhabitants disperse.

Mr. Forsyth, as well as many other writers, bears testimony to the effects of the mal'aria which affects the Campagna. He says:—"This mal'aria is an evil more active than the Romans, and continues to increase in spite of all the science which they publish against it. Last autumn (1801), I believe, four thousand persons died victims to it in the Roman hospitals. It is a battle renewed every spring, and lost every fall. In some tracts the mal'aria has been established for many ages; but now it is advancing on the suburbs and the city of Rome, while the checks opposed to its progress are either defective or absurd. By clearing the woods of Nettuno, which the ancients wisely held sacred, government has lately removed one defence against the sea-vapours, which now, mixing freely with those of the land, render them doubly noxious. The mephitic air, being heavy, and therefore low, may be stopped by low hills, woods, and even buildings." Elsewhere he says:—"Thus the Campagna remains the same melancholy waste, divided only by ruined aqueducts, without habitation, or hedge, or tree; and all this in spite of doctors who are daily offering new recipes to cure the air. Some prescribe the planting of olive or mulberry trees, at once to absorb the miasmata and enrich the country; one Cardinal has recommended a nightly patrol of the sheep and black cattle; another has proposed to pave the Agro Romano."

Mr. Woods, in his 'Letters of an Architect,' speaks of the district in terms not quite so unfavourable, but still bad enough to disturb the current ideas respecting sunny Italy:—"Here, I apprehend, we entered upon the Campagna di Roma, 'a dreary waste expanding to the skies;' not entirely uncultivated or uninhabited, but neither the one nor the other is at all in proportion to the extent: it is not flat, but varied by hills and valleys; or rather, it is an inclined plane, intersected by valleys, sometimes as much as one hundred and fifty feet in depth, with steep, broken, and often rocky banks, more or less covered with brushwood, and a few trees scattered here and there."

It has been shown that the unhealthy state of the Campagna is greatly owing to the thinning of its population; and that this thinning has been the result of political events. The overflowing of the banks of lakes, canals, and streams, consequent on the neglect to which the country has been exposed, and the putrefaction of vegetable and animal substance, which a better ordered population would have disposed of in some other way, have greatly aggravated the mal'aria of the district. The Roman citizens being in early times engaged in foreign wars, the cultivation of the country was left to slaves; and the patricians, successful generals, and enriched consuls, having accumulated properties in large masses, turned fields into large parks and pasture-grounds. The soil, thus given up in great part to spontaneous vegetation, developed and increased deleterious emanations; and the neglect of watercourses and streams caused overflowings in the low towns. Strabo, Cicero, Livy, and Horace, all speak of the increasing unhealthiness of the country around Rome; and we find that, instead of bringing the district into healthy cultivation for corn, it became stagnant and almost profitless, while the inhabitants of Rome were supplied with corn from Africa and Sicily.

The *Pontine Marshes*, forming the southern extremity of the Campagna di Roma, have caused more perplexity to the Italians than any other portion of the lowlands. This is really marshy land, and, as such, affects all the surrounding districts, rendering them more unhealthy than they would otherwise be. Captain Basil Hall has well described the Pontine Marshes. "The road which has been built upon the surface of these swamps is about twenty-four miles long: it is straight, flat, and hard, so that the carriage bowls along pleasantly enough; and if one could only get rid of the idea of insalubrity which attaches to the spot, the drive would not be disagreeable. The luxuriance of the vegetation, due to a rich soil and a plentiful supply of moisture and heat, is so great, and the colours of the foliage so varied and brilliant, that the eye is almost dazzled with the beauty of this treacherous region. Were it not for the stagnant pools of water matted over with a green scum like the coat of a snake, which occasionally peep through the dense brushwood of leaves and flowers, and the languid flow of the dirty canals on either side of the road, and the absence of hearty and healthy cultivation, one might suppose it a sort of wild garden. When we first entered the Pontine Marshes, a little before sunrise, a thick fog rested so near the ground, that only the tops of the trees and the higher bushes could be distinguished, like islands rising out of a sea of milk. As not the smallest breath of air passed over the face of the swamp to disperse the fever-giving miasmata, it was impossible not to feel that a sort of witch's cauldron was simmering to our destruction, and that this odious fog was the poisonous steam which the atmosphere of the night had engendered. I felt a sudden chill on entering the cloud, and longed earnestly for the sun to clear away the mischief. He succeeded at last in absorbing the mist, leaving every bud and bough, every blade of grass, and even the dusty road itself, drenched in dew. This, however, was not the cheerful dew after a clear and serene night, but the drippings of the dark churchyard vapours of the pestilential marsh—not the gentle rain from heaven upon the place beneath, but the noxious moisture exhaled from ground which emperors and popes have for ages in vain tried to purify by draining. The air, too, felt so heavy, that the respiration became loaded, as if the atmosphere had nearly lost its elasticity or the lungs their energy. Although all this was, of course, only fancy, there was no fancy, alas! in the supposition that I was swallowing, at every inspiration, the seeds of a new and still more malignant fever. Never, accordingly, shall I forget the delight of getting out of these horrid swamps, and arriving at Terracina."

The allusions by Captain Hall to the road across the marshes, and to the efforts of emperors and popes to drain them, point to the great exertions which have been made from time to time to bring this district into a more healthy and serviceable state. It is said that at one time there were thirty-three towns on the present site of the marshes, one of which, Pometia, gave name to the district. Whether the towns were depopulated gradually or suddenly does not seem now to be ascertainable; but the authorities at Rome were obliged from time to time to direct their attention to this quarter, not only with a view to reclaim so large a tract of ground rendered useless, but also to remove so great an exciting cause of fever. Appius Claudius made a high road through the marshes, which was called by his name, and which was meant probably as a means of drying them. The Consul Cethegus followed his example. Julius Cæsar conceived the gigantic plan of conducting the river Tiber across the Pontine Marshes; but death prevented the realization of his project. Augustus limited his exertions to making several canals intersect the district, as a means of draining it. Under his successors nothing was done till the time of Nero, who caused new canals to be executed; and Trajan afterwards continued the

operations for ten years, with so much zeal, that a considerable portion of the marshy district was drained, and the Appian Way restored. During the troubles attendant on the fall of the Empire, the Pontine Marshes were neglected; and Theodoric appears to have been the only one of the invaders who did anything for their amelioration.

When the Papal power succeeded to the débris of the Roman Empire, renewed efforts were from time to time made. Pope Boniface VIII. caused a canal to be cut, which rendered the environs of the towns of Sezze and Sermonetta dry. Martin V. pursued with energy a series of operations which promised to have been valuable, but for his death. Leo X. made a present of the entire territory of the Pontine Marshes (on condition that he would drain them) to Julius de' Medici; but no good appears to have been effected by this arrangement. Sixtus V., in 1580, caused a large canal to be dug and dykes erected; but the dykes burst, and all his labours were rendered useless. None of the following popes, till Pius V., did anything in the matter; but this pontiff, after causing the levels of the district to be taken, and the depth of the canals and streams ascertained, pursued an extensive course of operations from 1778 to 1788, and effected more good than any of his predecessors. But still, with all these efforts, the angle of descent towards the sea is so slight, that the waters which collect in the marshes from the hills have never yet been able to find an adequate outlet. Tournon thus speaks of the district as circumstanced at the time of his visit:—"Those parts which have been recovered belong to the Apostolic Chamber; but Pius VI. gave them in *enfiteusi*, or perpetual leases, to a few families, who do not pay altogether 100,000 francs rent for about 40,000 acres of land. The Duke Braschi, the banker Torlonia, the Duke Fiano, the Marquis Massimi, and the family of Rappini, the engineer who directed the works, are the principal lessees. Had the allotments been smaller, and on common lease terms, the ground would have been better cultivated, the works would have been kept in better preservation, and the government would have derived a much greater profit."

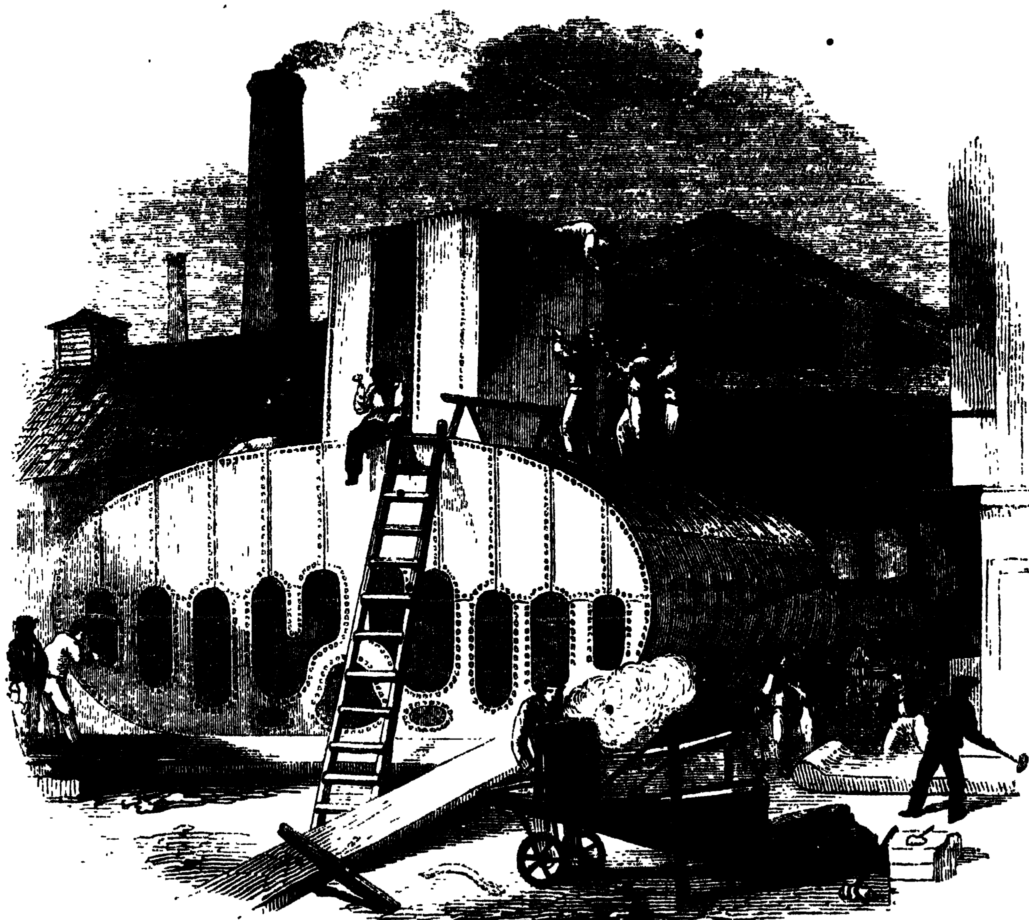
A Chinese Public Garden.—In the centre of a serpentine sheet of water there is a rocky island, and on it a large temple of two stories, fitted up for the accommodation of the wealthy public. Pillars of carved wood support the roof; fretted groups of uncouth figures fill up the narrow spaces; while moveable latticed blinds screen the occupants from the warmth of the noonday sun. Nothing can surpass the beauty and truth to nature of the most minutely carved flowers and insects prodigally scattered over every screen and cornice. This is the central and largest temple. A number of other light and aërial-looking structures of the same form are perched upon the corners of artificial rocky precipices and upon odd little islands. Light and fanciful wooden bridges connect most of these islands, and are thrown across the arms of the serpentine water, so that each sequestered spot can be visited in turn. At a certain passage of the sun, the main temple is shaded in front by a rocky eminence, the large masses of which are connected with great art and propriety of taste, but in shape and adjustment most studiously grotesque. Trees and flowers and tufts of grass are sown and planted, where art must have been taxed to the utmost to procure them lodgment. In another part of the garden there is a miniature wood of dwarf trees, with a dell and waterfall; the leaves, fruits, and blossoms of the trees are in proportion to their size. Tortuous pathways lead to the top of the artificial mountain, each turning formed with studied art to surprise and charm, by offering at every point fresh views and objects. Flowers and creepers sprout out from crevices; trees hang over the jutting crags; small pavilions crested with the white stork, their emblem of purity, are seen from almost every vista, while grottoes and rocky recesses, shady bowers and labyrinths, are placed to entrap the unwary, each with an appropriate motto, one inviting the wanderer to repose, another offering quiet and seclusion to the contemplative philosopher.—*Closing Events of the Campaign in China, by Captain Loch.*

Madrid as a City.—I have visited most of the principal capitals of the world; but upon the whole, none has ever so interested me as this city of Madrid, in which I now found myself. I will not dwell upon its streets, its edifices, its public squares, its fountains, though some of these are remarkable enough; but Petersburg has finer streets, Paris and Edinburgh more stately edifices, London far nobler squares, whilst Shiraz can boast of more costly fountains, though not cooler waters. But the population! Within a mud-wall scarcely one league and a half in circuit, are contained two hundred thousand human beings, certainly forming the most extraordinary vital mass to be found in the entire world; and be it always remembered that this mass is strictly Spanish. The population of Constantinople is extraordinary enough, but to form it twenty nations have contributed—Greeks, Armenians, Persians, Poles, Jews (the latter, by the by, of Spanish origin, and speaking among themselves the old Spanish language); but the huge population of Madrid, with the exception of a sprinkling of foreigners, chiefly French tailors, glove-makers, and perruquiers, is strictly Spanish, though a considerable portion are not natives of the place. Here are no colonies of Germans, as at St. Petersburg; no English factories, as at Lisbon; no multitudes of insolent Yankees lounging through the streets, as at the Havanna, with an air which seems to say, the land is our own whenever we choose to take it; but a population which, however strange and wild, and composed of various elements, is Spanish, and will remain so as long as the city itself shall exist.—*Barrow's The Bible in Spain.*

Trades at Vienna.—Among the articles made in large quantities in Vienna are theatrical decorations, wherewith it furnishes all the stationary and locomotive theatres of the Austrian empire. Many shops confine themselves to the sale of frippery of this kind, particularly diadems, and jewelled finery for the queens and princesses of the mimic scene. Great numbers of these diadems are made by the goldsmiths of Vienna. They make use of a peculiar composition of lead, tin, and bismuth, called "stage composition." It has so good an effect that at a little distance the deception is complete. The small cut sides of the metal are not raised, but put together in a concave form: when the light plays on them, they have all the appearance of precious stones. It is a remarkable fact, that the people of Hamburg have learnt only within the last fifteen years how to bind a ledger. Before that time the great folios were generally sent for from England. The people of Vienna have not yet mastered this apparently simple art; for Girardet, the most considerable bookbinder in the city, who employs thirty-six journeymen, maintains among them three Englishmen for all the solid and difficult work, and nine Frenchmen for that requiring delicate handling and taste. These people understand their work thoroughly, and what they do is admirably well done. They work apart from the German workmen, in order to preserve the mystery of their craft. There are many kinds of leather used for this purpose which are not to be had in Germany, so that the stuff, as well as the tools and the workmen, must be had from France and England. Nothing can exceed the beauty, elegance, and solidity of Girardet's bindings, and their variety is quite as admirable. Every two months there is a general clearance of old forms and patterns, to make way for new ones.—*Austria, &c., by J. G. Kohl.*

Character of North American Indian Villages.—The forms of Indian lodges are worthy of attention, each tribe having a different mode of shaping and arranging them, so that it is easy to tell, on seeing a lodge or encampment at a distance, to what tribe the inhabitants belong. The exterior of the Omaha lodges have often a gay and fanciful appearance, being painted with undulating bands of red or yellow, or decorated with rude figures of horses, deer, and buffaloes, and with human faces, painted like full moons, four or five feet broad.—*Washington Irving's Astoria.*

A DAY AT THE CLYDE STEAM-BOAT WORKS.



[Steam-boiler Making.—Vulcan Foundry.]

It has been said of the River Clyde—the Thames of Scotland, as regards commerce—"Compared with the bulk of its waters and the breadth of its stream, it is probably unsurpassed in the world for the quantity and stir of its navigation; not only bearing along ships of heavy burthen and deep draught of water, and plentifully dotted with yawls and wherries, but kept in constant foaming agitation by large steam-ships bearing heavy cargoes from the shores of England and Ireland, by numerous coasting steam-vessels careering over its surface with live freights of human beings, and by steam tugboats dragging behind them trains of sailing-craft too unwieldy to pilot their own way within its narrow channel."

The Clyde is so connected with the commercial enterprise of the country, with the rise and progress of steam-navigation, and with the construction of steam-boats and marine steam-engines, that we have thought a notice of the Steam-Engine Factories of Glasgow might enable us at the same time to glance at a few matters which well illustrate the relation of these factories to the commerce of that busy city. The name of Napier is deservedly noted in connection with marine steam-engines at Glasgow; but the same name also occupies a place in the history of the progress of steam-navigation; and the one may be made to illustrate the other.

How the labours of many men led to the gradual development of the idea that steam might be brought to act as a moving-power for ships, has been largely treated in various publications and forms, indeed the subject of many bulky volumes. When the Marquis of Worcester, in his 'Century of Inventions,' spoke of an invention by which he could "make a vessel of as great burthen as the river could bear to go against the stream, which, the more rapid it is, the faster it shall advance, and the moveable part that works it may be, by one man, still guided to take the best advantage of the stream, and yet to steer the boat to any point"—it is supposed that he alluded to some kind of steam-engine; but we are left wholly in the dark as to whether the matter was anything more than a speculative conjecture in his own mind. Savary and Papin tried to bring steam to bear upon navigation; and in 1737 Jonathan Hulls published a pamphlet in which he explains a clumsy but ingenious mode of constructing a steam-boat; but there is no evidence that he reduced it to practice. Then followed Daniel Bernoulli's essay on the practicability of propelling vessels by paddle-wheels urged by steam; then a similar essay by Gau-

tier; then a proposal, by a Genevese minister, to use propellers acting on the principle of the duck's foot; then various plans proposed by D'Auxiron, Perier, and Jouffroy, in France, and by Rumsey, Fitch, and Evans, in America—all exhibiting more or less ingenuity, but failing either in principle or in practicability.

At length we come to the series of proceedings by which the two northern cities, Edinburgh and Glasgow, honourably distinguished themselves, long before London did aught in the cause of steam-navigation. In 1787 Mr. Miller, of Dalswinton in Dumfriesshire, while describing a contrivance for moving boats by paddles worked by men or horses, remarked:—"I have reason to believe that the powers of the *steam-engine* may be applied to work the wheels, so as to give them quicker motion, and consequently to increase that of the ship." The idea is said to have been suggested to him by a young man in his service, Mr. James Taylor; and Miller obtained the aid of Mr. Symington, a civil engineer of Edinburgh, in working out the idea. A small engine was accordingly made at Edinburgh by Mr. Symington, and sent in 1788 to Dalswinton, where it was placed on one side of a double pleasure-boat, the boiler being on the other side, and the paddle-wheels in the middle. The apparatus was tried in a small lake, and Mr. Miller had the pleasure of seeing his little bark move along at the rate of five miles an hour, being perhaps the first really successful instance of the kind. He then caused engines and paddles to be fitted to one of the large boats on the Forth and Clyde Canal; and towards the end of the year 1789 many short trips of an experimental character were made with this boat, a speed of six or seven miles an hour being attained. For some reason or other Mr. Miller ceased to pay any further attention to the matter; but the success of his attempts drew attention more prominently to the subject.

From 1789 to 1812 the experiments made in England and Scotland in furtherance of steam-navigation were not attended by any marked results. Earl Stanhope constructed a vessel with duck-foot paddles, which, however, did not travel faster than three miles an hour. Mr. Symington made a steam-tugboat for the Forth and Clyde Canal, which he was afterwards obliged to abandon, because the Company—correctly or incorrectly—supposed the motion of the paddles would injure the banks of the canal. In 1806 Mr. Fulton, of America, after making some experiments in France, procured all the practical information which Symington, Miller, and others could give him in Scotland, and succeeded after a time in running a steam-boat on the river Hudson, in America, from New York to Albany, being the first instance of a steam-boat commercially used as a passage-boat, the preceding attempts in Scotland having been rather experimental than commercially practical.

It appears that Mr. Henry Bell, whose name is associated with the rise of steam-navigation on the Clyde, had been instrumental in procuring for Fulton various items of information from Mr. Miller; and in a short paper which he contributed to the 'Caledonian Mercury,' in 1816, after alluding to a letter which he had written on the matter, he uses this remarkable expression:—"This letter led me to think of the absurdity of writing my opinion to other countries, and not putting it in practice myself in my own country; and from these considerations I was roused to set on foot a steam-boat." He made many attempts with partial success, and at length produced the little steam-boat 'Comet,' which will always be remembered in connection with this subject, as the first steam-boat made in Europe which successfully plied as a passage-boat. It was built by Messrs. Wood, of Port-Glasgow, on the Clyde. It was only forty feet in length of keel, with about ten feet beam; its tonnage was about twenty-five tons, and it was worked by a little engine of three horse-power. The 'Comet' plied on the Frith of Forth, between Grangemouth and Leith, a distance of twenty-seven miles, which it was accustomed to do, in ordinary weather, in about three hours and a half. The little steamer was at length lost on the Doors of Dorrismore; but the tiny engine was recovered, and has since been carefully preserved by one of the engineering firms of Glasgow. When the British Association held its meeting in Glasgow in 1840, two relics were exhibited in the model-room which excited much attention from those who watch the mighty progress of steam-power: viz. the small and rudely constructed steam-engine on which James Watt made many of his experimental researches (and which is preserved in one of the rooms at the Hunterian Museum in Glasgow University); and the small engine which Henry Bell had used in the Comet steam-boat.

It was in 1813 that the 'Comet' effectually solved the problem of steam-navigation on British rivers; and from that time the tide of enterprise set in strongly in that direction. In March, 1815, Mr. John Thomson started the 'Elizabeth,' a steamer fifty-eight feet in length and of eight horse-power; and numerous other steamers rapidly followed, principally on the Clyde and the Forth; Glasgow, Greenock, and Port-Glasgow becoming by degrees the scene of most extensive arrangements both as respects the vessels themselves and the engines whereby they were propelled. There next took place a series of improvements which we will notice from the competent authority of Mr. Scott Russell, who, in his treatise on 'Steam-Navigation,' in the new edition of the 'Encyclopædia Britannica,' says:—"The vessels were, however, of small dimensions, of low proportion of power, and of little speed, until the year 1818, when Mr. David Napier directed his attention to the improvement of steam-navigation. It is to this gentleman that Great Britain owes the introduction of deep-sea communication by steam-vessels, and the establishment of Post-office steam-packets. In 1818 Mr. Napier established between Greenock and Belfast a regular steam communication, by means of the 'Rob Roy,' a vessel built by Mr. William Denny of Dumbarton, of about ninety tons burthen and thirty horse-power. For two winters she plied with perfect regularity and success between these ports, and was afterwards transferred to the English Channel, to serve as a packet-boat between Dover and Calais. Having thus ventured into the open sea, Mr. Napier was not slow in extending his range. Soon after Messrs. Wood built for him the 'Talbot,' of one hundred and twenty tons. With two of Mr. Napier's engines, each of thirty horse-power, this vessel was in all respects the most perfect of her day, and was formed on a model which was long in being surpassed. She was the first vessel that plied between Holyhead and Dublin. About the same time he established the line of steam-ships between the stations of Liverpool, Greenock, and Glasgow. For the traffic of these stations he built the 'Robert Bruce,' of one hundred and fifty tons, with two engines of thirty horse-power each; the 'Superb,' of two hundred and forty tons, with two engines of thirty-five horse-power each; and the 'Eclipse,' of two hundred and forty tons, with two engines of thirty horse-power each. All these were established as regular deep-sea traders before the year 1822."

It will be observed that nearly all the steam-boats and steam-engines here mentioned as being constructed on the Clyde, were worked not on that river, but in the open sea; and if we trace the past progress of the city of Glasgow we shall perceive a reason for this. There does not exist, perhaps, a parallel instance throughout Europe to the improvements which Glas-

gow capital and enterprise have wrought on the river Clyde. In other places sand-banks, bars, and obstructions to the free navigation of a river have been removed, quays have been constructed, and river-walls built; but for a large maritime commerce to be actually *created* by such means, is what we rarely find to be the case. At the beginning of the present century, only small craft of thirty or forty tons could get up the Clyde to Glasgow; and persons now living well remember when weeks elapsed without a keel reaching up to the city; whereas now vessels of six or seven hundred tons, and drawing sixteen feet of water, can come up to the very bridge of Glasgow; and indeed vessels of as great burthen as seventeen hundred tons have been fitted with their engines close to the quay at Glasgow; while at some tides a depth of twenty feet water is procured close to the bridge. This mighty progress is closely connected with the spread of steam-boat operations in Scotland, and may fittingly be noticed here in a brief manner.

Until the recent improvements in the Clyde, the harbour for Glasgow, in respect to foreign commerce or coasting trade, was many miles from the city. About the middle of the sixteenth century, the Clyde being so much impeded by fords, shoals, and banks as to be scarcely navigable for any craft above the burthen of an open boat, the inhabitants of Glasgow, Renfrew, and Dumbarton agreed to labour on the river six weeks alternately, with the view of opening up a communication between these places for small craft. A government commissioner having to report on the revenue of Scotland in 1651, and having spoken of the trading operations of the Glasgow people, said:—"The mercantile genius of the people is strong, if they were not checked and kept under by the shallowness of their river, every day more and more increasing and filling up so that no vessel of any burthen can come up nearer the town than fourteen miles, where they must unlade and send up their timber on rafts, and all other commodities by three or four tons of goods at a time, in small cobbles or boats of three, four, or five, and none above six tons a boat." The Glasgow merchants first had their shipping-port in Ayrshire; but wishing for a spot more convenient, they tried Dumbarton, and afterwards Troon, but were repulsed at both, for the sapient reason (in the first case), "that the influx of seamen would raise the price of provisions to the inhabitants;" and (in the second), "that it would occasion a rise in the price of butter and eggs." They succeeded ultimately in purchasing a piece of ground on the south bank of the Clyde, where in 1662 they constructed the first dry-dock in Scotland, at the spot which thenceforward obtained the fitting name of 'Port-Glasgow.'

Until the Union with England, nothing occurred to extend the commerce or shipping of Glasgow very rapidly; but that event gave an extraordinary impetus to the city, by opening a trade with the colonies. The Glasgow merchants at first chartered vessels from Whitehaven and other ports, and filled these vessels with British goods, which were bartered for tobacco in the American colonies. By degrees, however, they made their operations centre more decidedly in their own city; and in 1718 the first vessel owned by Glasgow merchants crossed the Atlantic. The traffic was carried on so spiritedly that the tobacco importers of the English ports loudly complained, and succeeded in obtaining enactments which severely crippled the Glasgow merchants. They survived the shock, however; and by 1772, out of ninety thousand hogsheads of tobacco imported into Britain, Glasgow alone imported more than half; one merchant possessing twenty-five ships engaged in the trade. The great tobacco-merchants formed at that time the aristocracy of Glasgow; and the names of many of the streets—such as 'India,' 'Tobago,' 'Jamaica,' 'St. Vincent,' and 'Virginia'—remain to indicate the sources whence the wealth of the city was mainly obtained. Various events, among which was the American war, tended to deprive Glasgow of a considerable portion of her tobacco-trade; but the wealth which that trade had created, the ships which it had caused to be built, the habits of enterprise which it had engendered, the repute and importance into which it had brought the merchants, and the extent of intercourse to which it had given rise with other countries—all enabled the Glasgow men to strike out new fields of enterprise, which have ever since been followed with untiring energy.

Meanwhile the improvement of the Clyde (the point to which these details tend) had been going on gradually. Greenock, situated about twenty-two miles lower down the Clyde than Glasgow, became the chief ship-building port for the river; while Port-Glasgow was the recognised spot for the Glasgow merchants to load and unload their cargoes. But it is plain that they must have had a strong inducement to bring their goods up to Glasgow, instead of towing them up piece-meal, as it were, in barges. We may picture to ourselves what would occur if all the Thames shipping had to stop at Erith or Purfleet, and thence to send their goods to London by small craft; and we may thence infer what, on a smaller scale, must have been the position of the Glasgow merchants. In 1688 a small quay was constructed at the Broomielaw (the name given to the Clyde and its banks at the western part of Glasgow), and slight improvements were made in the bed of the river, so far as the funds of the corporation would admit; but it was not until the time of Smeaton that any extensive improvements were attempted. After a survey of the river by that engineer, it was recommended to render it navigable by locks; but this plan was given up for another, by which the navigation was to be improved by jetties or dykes. An act being obtained in 1770, empowering the corporation to act as trustees and to levy tolls to defray the expenses, operations commenced. In five years the engineer erected one hundred and seventeen jetties, by which the stream was so narrowed and deepened as to admit vessels to the Broomielaw drawing six feet of water. By 1792 an addition of three hundred and sixty feet was made to the length of quay or harbour at the Broomielaw, and by 1811 a further increase of nine hundred feet. But however continuous were these improvements, the spread of commerce more than kept pace with them; and the corporation were compelled to apply for increased powers in 1825, by which vast changes have since been wrought. Still greater did the commercial operations become, until at length, in 1840, another act was obtained, under which, for the next twelve or fifteen years, most extensive enlargements and improvements will take place in the river, at an estimated cost of not much less than a million sterling.

A short steam-boat trip down the Clyde from Glasgow to Greenock affords the means of observing the nature of the improvements which have been wrought. Starting from the lowest of the four bridges, we find the Broomielaw studded with ships and boats as closely as it is possible to be without injury. Steamers of a splendid character for Liverpool, Dublin, and Belfast—others of a smaller class for Dumbarton, Greenock, Helensburgh, Rothsay, and other places near the mouth of the Clyde—and trading vessels from every part of the globe, crowd this busy spot. On the southern bank there has been built a compact river-wall twelve hundred feet in length, with deep water at all phases of the tide; and on the northern bank a similar wall or quay, more than three thousand feet in length.

This at present forms the limit of the harbour; and when we get below this Broomielaw, a stranger is apt to be astonished that so much has been done with such a river. From thence onward towards Renfrew the river is so narrow that it is difficult to conceive the existence of a busy and closely-filled harbour above it: but though narrow, it is deep and regular; every yard of it for many miles is carefully watched, the bed dredged, the banks brought to a regular slope and faced with stones, useless inlets and creeks filled up, projecting points pared away, and all obstructions sedulously guarded against. Lower down the river, where the stream is of greater width, bell-shaped structures are placed at intervals on or near the banks to mark the progress of the tide; and at one point on the northern bank we see a monument which has been erected to Henry Bell, the father of Clyde steam-navigation, and one of that too numerous class of persons who fail to reap, during their lifetime, personal advantage from their ingenuity.

One effect of the Clyde improvements has been to transfer to Glasgow much of the commerce which used to be conducted at Greenock and Port-Glasgow, and with it much of the ship-building operations; while the steam-engine works have all along found at Glasgow a fitting locale. But still those two ports retain much of their past importance, and must share with their greater neighbour the distinction which "Clyde steamers" and "Clyde engines" have acquired. In some cases vessels are built at Greenock, and proceed up to Glasgow to be fitted with their engines: in other cases both vessels and engines are made by Glasgow firms; and there is seldom a day on which some vessel or other may not be seen drawn up close to the northern quay, at the western end of the Broomielaw, receiving on board either boilers or engine, or some other piece of mechanism, from one or other of the large engine-works situated in the western part of Glasgow.

We are not writing a history of steam-navigation or a description of Glasgow; but we have thought it well to give an outline of a few circumstances which show the connection between these subjects and the rise and progress of steam-boat and engine operations at Glasgow; and having done so, we will now glance withinside some of these busy establishments, and witness the general character of the processes carried on therein. Mr. David Napier, whose contributions to the improvement of steam-navigation we before alluded to, is no longer a Glasgow engineer; but the three establishments of Mr. Robert Napier, which we have been obligingly permitted to visit, will afford us the means of gathering a few notions on the subject.

Iron steam-boats have been one of the most marked objects of improvement in steam-navigation; and the builders in the Clyde and in the Thames have not been slow to follow the example set to them in this matter by (we believe) the Liverpool builders. The firm whose establishments we are about to visit rents a spot of ground on the southern bank of the Clyde, a mile or two below Glasgow, where the building of iron steam-boats is carried on; and we may shortly describe the chief points of difference between those operations and the building of a common wooden vessel.

In the Supplements for May and June, 1841, a slight account was given of the mode of proceeding in the construction of wooden ships, in connection with an extensive Thames ship-building yard; and in that account it was explained that the keel, the ribs or timbers, the stem and stern-posts, and the planking, constituted the main pieces which give shape and stability to the hull of a ship. Now in an iron steam-boat all these parts are made of iron; and the appearance of an iron steam-boat yard consequently differs much from such a one as was formerly described. There are no huge trunks of oak lying in heaps in the yard; no 'converting' sheds, where the business of sawing and shaping the timbers is carried on; no 'steaming-tank' for steaming the planks preparatory to bending round the contour of the ship; no trenail-cutters; no oakum-spinners. But instead of these there are workers in iron, with their forges, their powerful punching-engines, their enormous cutting-machines, which will sever a bar of iron as if it were a piece of ribbon, their anvils, their hammers, their rivet-furnaces; while around are lying sheets of iron from the rolling-mill, and bars from the drawing-mill, with guide-pieces for bending them to the required form. We have iron bars instead of timbers, sheet iron instead of planks, rivets instead of trenails, forges instead of saw-pits, and iron scraps instead of chips of wood.

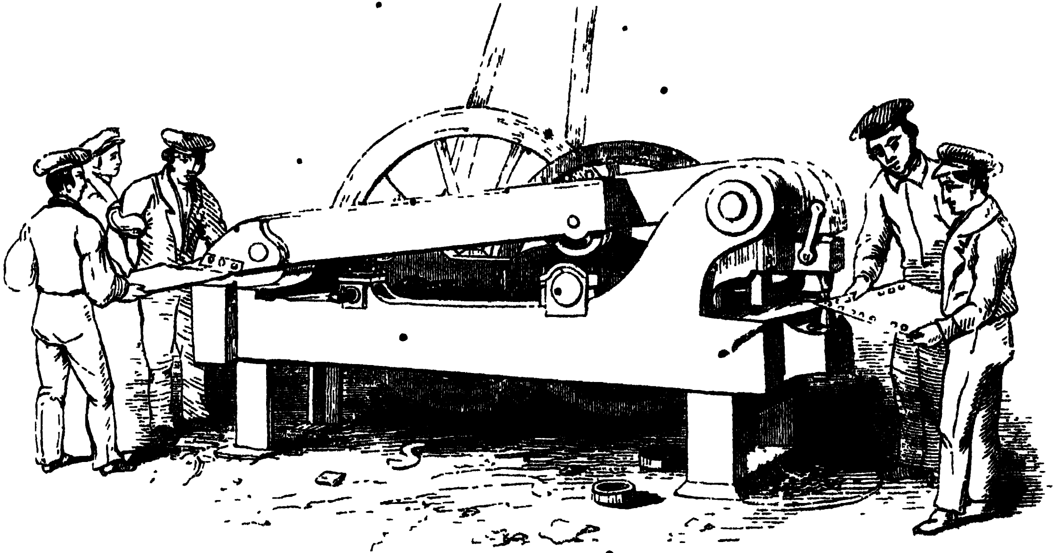
There must be a ship-draughtsman for an iron ship as well as for a wooden one, and he lays down the draught of a ship nearly in the same manner. He selects a large flat surface of flooring, and on this he chalks a series of lines destined to show the exact size and shape of the various 'ribs' of the ship; and it is here that any improvement suggested in the form of the vessel's hull must show itself, preparatory to the mechanical operations of the ship-builder. The process is not so complex for an iron ship as for a wooden one; since the draughtsman, in the latter case, has to indicate not only the height and curvature of the various timbers which constitute the framing, but also the 'scantling' or breadth and thickness of every individual piece at every part of its length. In iron vessels this trouble is saved, since the contour or cross-section of every rib is given to it while yet in the state of an iron-bar. In building wooden ships a large number of 'mould-boards' or thin pieces of wood are prepared, in exact conformity with the chalk lines on the mould-floor, as guides to the sawyers in cutting the timbers: but for iron ships thin rods only are necessary, sufficiently firm to give the curvature to the several ribs.

The keel is laid down in a slightly declining position from stem to stern, as in wooden vessels, for the facility of launching; and, like it, is generally formed of several pieces fastened end to end. But these pieces are of iron instead of wood, and are of much smaller 'scantling.' An iron keel six inches deep by three wide will suffice for a vessel of one thousand tons burthen! The various pieces of which it is formed are bevelled off at each end, so that each one may furnish a recess for receiving the other; and the two are fastened by iron bolts or rivets driven into holes bored for the purpose. The keel, standing up on one edge, exhibits a range of holes from end to end; and these are intended for the reception of the rivets which are to bind the keel, the ribs, and the 'skin' of the vessel together. The pieces of iron which form the stem and stern-posts are bent to the required form before being brought to the yard, and are then riveted to the ends of the keel: for it may be observed generally that rivets form the almost universal mode of fastening in an iron boat.

Perhaps nothing in the appearance of the skeleton of an iron vessel strikes a stranger as being more remarkable than the extreme slightness of the ribs, compared with the bulky timbers of a wooden vessel. Their cross-section is neither quadrangular nor circular, but may be described as exhibiting a square from which a quadrant has been removed at one corner. A bar measuring three inches on each of the two sides, by three-quarters of an inch in thickness, will constitute the rib for an iron vessel of considerable dimensions.

The form thus given seems to be intended to afford facilities for boring holes for the reception of the numerous rivets by which the ribs are fastened to the other parts of the vessel. The iron is brought to the exact form in the rolling-mill, where it passes between two rollers so grooved as to give the cross-section required. When it is about to be wrought into the form for the ribs of a ship, it is cut to the proper lengths, heated in fires or furnaces close to the place of working, and bent round to the required curvature on anvils; the curved rods before alluded to serving as guides to the attainment of the proper curvature. These pieces, when formed to the desired shape, are carried to the building-slip, and there riveted to the keel, at distances of from twelve to eighteen inches apart.

The sheet-iron which forms the planking or 'skin' of the vessel is a much more manageable material than the stout oaken planks employed in building wooden ships. It is rolled into sheets at the mill, of such thickness as may be desired, and cut to the requisite length and width by the powerful shears which are used in most iron and engineering works. The sheets



[Cutting and Punching Engine.]

are then brought by hammering to the proper curvature for bending round the exterior of the vessel, a guide or gauge being employed to regulate and determine the degree of curvature. They are then fastened to the ribs and to the keel by means of rivets, the number of these fastenings being extremely large.

When the keel, the stem and stern-posts, the ribs, and the sheet-covering are all put together, the distinguishing characteristics of an iron ship are nearly at an end; for the interior and upper fittings bear a pretty close analogy whether the vessel be of iron or of wood. Bar-iron for the ribs, sheet-iron for the covering, and bar and cast-iron pieces for the beams and a few other parts, constitute the metallic skeleton which is afterwards to be decked out with the finishing appendages. We saw three iron-built vessels in three different stages of progress towards completion, which afforded the means of noticing the successive steps. One was on the building-slip, the keel laid down, the stem and stern-posts erected at the ends, and about one-half of the ribs set up, constituting a skeleton whose lightness contrasted strikingly with the heaviness necessarily involved in the frame-skeleton of a wood-built vessel. Another was a very small sailing-vessel, whose progress illustrated the extraordinary rapidity with which iron vessels can now be constructed; the keel had been laid down about a fortnight before the period of our visit, and the vessel was expected to be in sailing order in another week; workmen being engaged on it as thickly as they could ply together. The third was a fine steamer called the 'Vanguard,' intended for the Irish station. This had left the building-yard, and was drawn up to the side of the quay at the Broomielaw, nearly opposite the engine-factories to which we shall presently allude, and where it had been supplied with the engines and machinery. It was a vessel of seven hundred tons burthen, and three hundred horse-power; it was about two hundred feet long, by twenty-seven 'beam' or width, and had paddle-wheels twenty-six feet in diameter. Most of the rougher portions of the work were completed; and painters, gilders, cabinet-makers, &c. were fitting up the interior in the splendid manner which distinguishes the steamers plying between Glasgow and the English and Irish ports. This, like the other two, had keel, ribs, beams, exterior coating, &c. of iron, and was an elegant specimen of this most remarkable constructive art.

We now leave the iron-boat yard, and pay a visit to the two engine-factories belonging to the same firm, both of which are in Glasgow, within a few yards of the Broomielaw quay. One of these is known as the 'Vulcan' foundry, and the other as the 'Lancefield' foundry or works; and at one or other are carried on almost the entire range of operations incident to the construction of marine engines, their boilers, and their subsidiary appendages. The writer of the article "Glasgow" in the 'New Topographical Gazetteer of Scotland,' while alluding to the operations at the Vulcan foundry, stated that the proprietor of these works "supplied the engines of the 'British Queen:' and in the course of one year, ending in October, 1840, he supplied six first-rate steam-ships with their engines, viz., two frigates, and four Transatlantic liners. The first two were the 'Vesuvius' and 'Stromboli,' which took up a worthy position at the siege and capture of St. Jean d'Acre, on 4th November, 1840; and the latter four were the Britannia, Acadia, Caledonia, and Co-

lumbia, now employed in carrying the mails between Liverpool and Halifax and Boston, North America. These liners were all built in the Clyde, are each of one thousand two hundred tons burthen, and propelled by engines of four hundred and forty horse-power." Since then, the East India steamers Berenice, Zenobia, and Victoria have also been provided with their engines from the same works. In short, the firms which are now engaged at Glasgow in marine-engineering works, including the names of Napier, of Craig, and of Todd and Macgregor, have most amply taken their share in the recent advancement of steam-navigation.

To describe all the separate pieces of a steam-engine, how they are made, and how put together, would be about as practicable and as interesting as to describe all the minute pieces of a watch; both would require thorough practical knowledge in the writer, and indomitable patience in the reader. But an idea of the general manufacturing arrangements involved would tax neither the one nor the other so highly; and this we will endeavour to convey.

In the first place the metal which is to be wrought up into a marine engine (and into other engines likewise) reaches the factory mostly in one of three states—rough metal for castings, bar metal for shafts and other stout purposes, and sheet metal for extensive surfaces. We here speak of iron, as being the metal incalculably more used than any other for such works; and we therefore expect to find, in a large engine-factory, the mechanical arrangements necessary for working up iron in these three states. We shall perhaps find this subdivision as well fitted as any for the popular sketch we have in view.

The 'Vulcan' foundry occupies a considerable area of ground in Washington Street, near the Broomielaw, and is, like all large factories, entered from without by folding-gates, whose "No admittance except on business" indicates that it is no place for idlers. Within the gates is an open quadrangle or space bounded on all sides by the buildings wherein the manufacturing operations are carried on. At the time of our visit there stood in this open area the cylinders and greater portion of the apparatus of an enormous steam-engine, about forty feet high, intended for the hot-air blast-furnace of an iron-work. On another side was a crane with an arm or lever whose radius swept round a good portion of the area, for the purpose of raising heavy weights from different quarters. On entering the buildings, the effect is very different, according to the kind of operations going on. On one side is the founding or casting house, with the sandy pit where the castings are made, the furnaces in which the metal is melted, and the other apparatus pertaining to a foundry; here, when the process of casting is not going on, the scene is the most quiet and the least bustling in the whole establishment. When we advance to that part of the premises where the boilers and funnels are made, quiet and silence are no more to be thought of. Of all the stunning and confusing noises incident to our manufactures, there is surely nothing to go beyond that which results from the ten thousand hard thumps which a steam-engine boiler receives while under the process of riveting: even when done in the open air it almost bewilders a by-stander; but when done under cover, as in the boiler-factory at Woolwich Dockyard, it is far worse. The appearance which this part of the yard presents, the enormous size of some of the boilers, the oft-repeated lines of rivets, the varied attitudes of the men while riveting, the locomotive forge at which the rivets are heated, &c., are slightly depicted in our frontispiece.

On passing within the engineering shops, the operations appear to partake more of the character of fine workmanship. The various shops are crowded with highly finished machines for working up wrought-iron into the variously shaped pieces required for steam-engine work. In the lowermost of these shops cylinders are bored, pistons fitted and adjusted, and all the heavy portions of the work prepared. There is a lathe here for turning wheels eighteen feet in diameter. Above-stairs the workshops contain benches, tools, and lathes, for preparing and finishing the smaller and finer pieces for steam-engines; as well as pattern store-rooms, pattern-making shops, &c.

In the smithery the operations are of a coarser kind. Here the forging is carried on; and as a necessary accompaniment of this operation the place is supplied with forge-fires, anvils, and all the hot and noisy appurtenances to such a place; while the lusty arms of the men are on every side wielding their heavy hammers. All the forge-fires in the smithery are blown by an arrangement far more efficacious than the bellows of the old method: there is a small steam-engine appropriated to the production of a continuous blast, which can be directed to any particular forge at pleasure, by moving a lever connected with a valve in the blast-pipe.

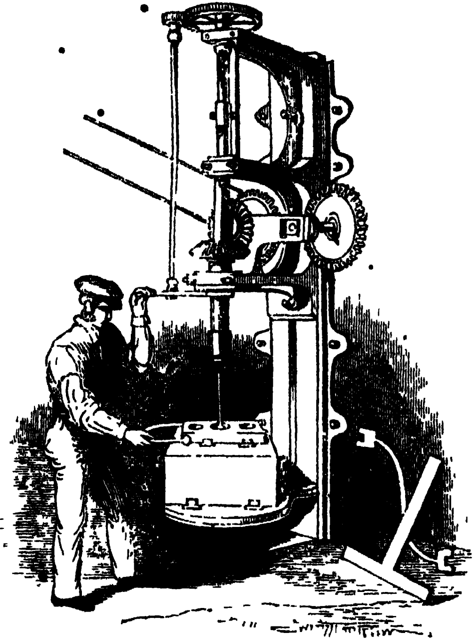
Let us next notice a little more closely a few of the operations here indicated. We may begin with the boiler. This very important part of a steam-engine, when it is considered that water and high-pressure steam have to be contained in it, may well be supposed to require careful manufacture. Mr. Scott Russell observes:—"The construction of a boiler must appear so simple an arrangement of materials, as to require very little ingenuity or contrivance; a large enough boiler placed upon a large enough fire being sufficient to generate any requisite supply of steam. Simple, however, as such an arrangement may seem, the best construction of boiler is a subject upon which very widely different and even opposite opinions are entertained by men of the greatest science and experience." So far as the practical construction goes, however, and without reference to the choice of form, the operations are somewhat as follow:—Whether the boiler be of copper or of iron (copper being the most durable, but iron the most frequently used, probably on account of its greater cheapness), the sheets are chosen of such thickness as is deemed necessary to give the strength required, and is cut to such sizes as will, when bent into the curved shape, form the boiler. Sometimes cast-iron plate boilers are used; but sheet-metal is much more prevalent. Every sheet or piece being attached to the adjoining one by rivets, the piercing of the holes for these rivets is one of the preliminary operations in boiler-making. The punching-machines employed in engineering differ a little in their construction, but they are always so strongly made, and urged by so great a power, as to pierce through metal with the greatest ease. The punch employed of course varies in size according to the hole to be pierced; but whatever be its size, the sheet of metal is placed beneath it, adjusted accurately, and then pierced through, the small piece of metal falling into a receptacle beneath. The plate or sheet is shifted on a few inches at a time, and pierced in the same way, until the whole outer edge of the metal is pierced. In most instances the cutting-engine and the punching-engine are distinct and separate; but the wood-cut on p. 381 represents a double machine comprising both of these parts. The ponderous upper bar has a punch at one end and a kind of scissor-blade at the other, which, through the vibratory movement of the bar, are brought alternately into action.

All the pierced plates for a boiler require a certain modification of surface to adapt them to the curvature of the boiler. This is effected by hammering on an anvil, a gauge or pattern being applied from time to

time to determine the character and amount of curvature. This being effected, the sheets are then fastened together by riveting; and this is in every respect a remarkable process. By the side of the boiler-maker is a small portable forge, expressly intended for heating the rivets. These rivets are short thick pieces of rod-iron with clumsy heads; and before being used they are heated to a red or almost a white heat. The two edges which are to be riveted being lapped one over another, and holes penetrating both of them, a red-hot rivet is put into each hole, and beaten with a powerful hammer until quite hard, by which time the head has become beaten down to a conical form. A man holds a hammer against the other side or end of the rivet, to afford a sufficient resistance to the blows; and he in his turn hammers down the inner end of the rivet. The overlapping edges of the sheet-copper are thus pressed together, not only by the beating which the rivet has received, but also by the contraction which it undergoes by cooling. Every rivet in every joint at every part of the boiler is treated successively in the same way; and thus arises the din and clatter always incident to boiler-making. Funnels for steam-boats, and all large vessels made of sheet-iron or copper, are put together much in the same manner as boilers.

The steam-engine operations connected with casting are very similar in their routine to other kinds of casting. The bed-plates, which go entirely under the engine of a steam-boat, the cylinders, the pistons, the beams, and various other parts are cast in sand in the first instance, and then worked up to a smooth and polished surface. In the case of a cylinder, where both the outer and inner surface are to be regular and uniform, a brick core or mould is built up, in the manner of those used in founding church bells (as described in the Supplement for March, 1842); and an outer casing being also formed, the vacancy between the two forms a receptacle for the melted metal which is to constitute the cylinder. All the cylinders for steam-engines, some of which are of such vast dimensions, are made in this manner. The bed-plates for marine engines are among the most ponderous specimens of casting. We saw one lying at the Vulcan foundry, twenty-four feet long by ten wide, and weighing twenty-four tons. Some are thirty or forty tons in weight, and cast at one time in one mould. These bed-plates consist not merely of a stout plate to go entirely beneath the engine, but also of the large vessel in which the steam is condensed, both being cast in one piece. The formation of the mould for these large pieces, the melting of thirty tons of iron in one furnace, and the casting of this metal without the intervention of air-bubbles or impurities, are among the most important operations of these establishments.

The forges and cast masses of iron, whether for shafts, wheels, cranks, cylinders, or any other portions of an engine, all require more or less finishing and adjustment when they leave the forge and the casting-pit; and these finishing operations constitute the most extensive part of the arrangements in an engine factory. At the Vulcan works, as we before observed, these processes are carried on in several floors of a large building, and involve the use of several distinct classes of working apparatus. One of these, for example, is that for boring cylinders. In the lowest floor of the engineering shop there was a steam-engine cylinder fixed upon the boring-machine, and undergoing the process of boring. This does not consist, as the name seems to imply, in boring a cavity through a solid piece of metal, but in giving a perfectly circular form and smooth surface to that which has already been formed by casting. The motion of a piston in a cylinder, to be smooth and air-tight, requires that the internal surface of the cylinder should be rigorously true; and as this exactitude cannot be produced by casting, it is attained by subsequent boring. The cylinder is placed horizontally, and the boring-instrument consists of a cutting edge or tool which revolves in contact with the inner surface of the cylinder. Some boring-machines, such as that represented in the annexed cut, are employed for furnishing smaller circular apertures, and do not differ much in appearance from drilling-machines.



[Boring Machine.]

The planing-machines employed in such factories are intended to produce the same effect upon a flat surface as the boring-machines upon a cylindrical surface. Supposing a piece of metal to be cast as flat as possible, but not so level and smooth as the object requires, it is placed horizontally, and the planing-machine passed to and fro over it. There is not to this machine a plane-iron fixed into a box, as for wood-work, but a stout, strong, hard piece of steel, having one edge sufficiently keen to cut away the surface over which it passes, and on which it strongly presses. The beauty of these machines consists in the nice adjustment by which the motion of the cutting edge is kept as one uniform horizontal plane, so as to impart perfect flatness and smoothness to the plate beneath. Our concluding cut represents one of these machines.

Lathes are a kind of working apparatus very extensively used in such establishments. All shafts which have been forged, and all smaller pieces of metal which have been forged or cast, and whose contour is circular, are submitted to the action of the lathe as a means of obtaining perfect circularity of form. The cutting tools are formed of very hard steel, and are applied to the surface of the metal very much in the same way as a wood-turner uses his chisels and gouges. Large wheels, in order to undergo the process of turning after casting, frequently require that a hole should be left in the floor of the shop to admit part of the diameter, as they would else be almost unmanageable.

Screw-cutting machines form another important class of working apparatus, since the screws for a

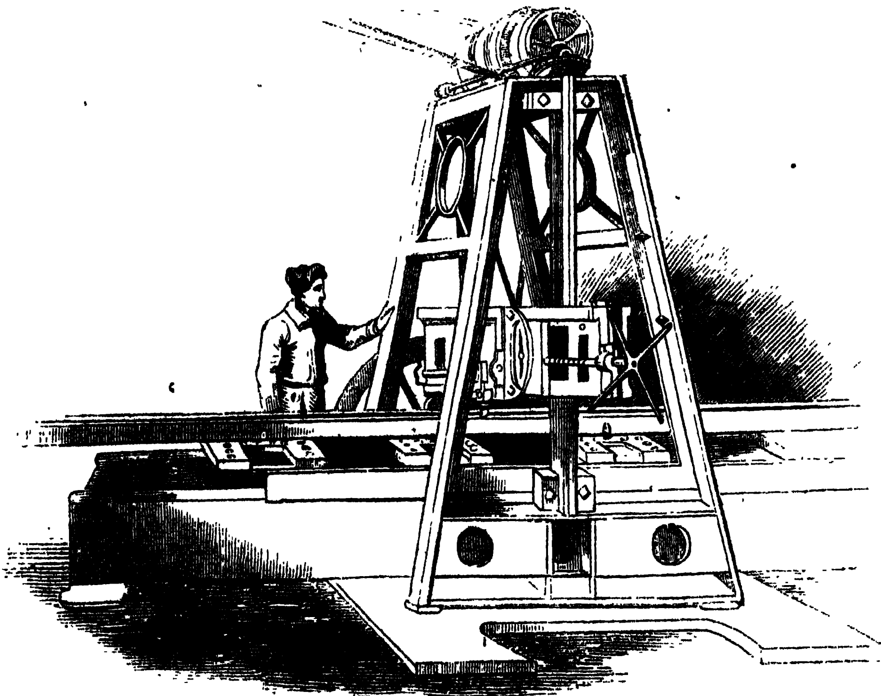
steam-engine, as for any other delicate piece of mechanism, require much accuracy of adjustment. These machines somewhat resemble lathes, in so far as there is a cutting edge applied to a revolving bar of metal; but the distinguishing feature is this, that while the bar which forms the shaft of the screw rotates, the tool which cuts the thread of the screw travels onward from end to end, and the relative velocities of these two movements determine the obliquity of the thread or worm.

In various shops, and in various parts of each shop, are other pieces of apparatus appropriated to the finishing of various pieces of metal. Piercing-engines, for making holes through sheets and thin plates—drilling-machines, for similarly piercing thicker plates—anvils, files, and a host of others, help to fill up the measure of an engineer's working apparatus. A steam-engine is not "one and undivided;" it is a thing of many parts, each of which requires accurate shaping, smoothing, and adjusting, before it is brought into connection with the rest. But though the pieces thus prepared are exceedingly numerous, the processes incident to their preparation have been pretty nearly comprised in those already glanced at: the making of patterns, gauges, and moulds; the casting-pit and its appendages; the forge and its swarthy attendants; the piercing and drilling machines; the cutting-machines; the apparatus and arrangements for riveting; the boring-machines; the lathes and screw-cutting machines; the planing-machines; the hammer, the file, the anvil—these are the agencies, directed by manual dexterity or muscular strength, or both, by which the mighty steam-engine is built up, and its various parts made to combine one with another.

We have spoken of all these arrangements as if in connection with the Vulcan foundry only; but the same will apply in a nearly similar degree to the Lancefield works, belonging to the same firm. These are situated somewhat farther west, but yet in immediate proximity to the Clyde. Here, as at the Vulcan, there is an open yard surrounded by buildings; and in these buildings the processes of forging, casting, planing, turning, &c. are carried on nearly the same as at the other works. We observed many of the rough elements for an iron steam-boat lying about the works: iron bars for the ribs, in one place; huge castings and bent pieces for the stem and stern, in another: quadrangular pieces from which the keel was to be built up, in a third; and so on. In other respects the two establishments are pretty much alike: the one was, we believe, an offshoot from the other, and, like it, gives employment to several hundred men. At the north bank of the Clyde, immediately opposite the end of the street where these works are situated, is a wooden shed or erection, for facilitating the transport of engines and boilers from the works to steam-boats lying alongside: and here we may often see huge boilers, many tons in weight, suspended in mid-air, and gradually descending to their place of reception in the vessel beneath.

Such busy scenes as these which the engineering establishments exhibit, taken in conjunction with the other manufacturing and commercial enterprises of the city, give to the whole an appearance of energy and prosperity well fitted to the motto which the citizens have chosen to adopt:—

"Let Glasgow flourish!"



[Planing-Machine.]



[Rajpoots.]

TRIBES AND CASTES OF INDIA.

RAJPOOTS

The Rajpoots are a warlike race, who, from pride of birth and superiority in arms, claim to be of a higher caste than any other Hindus. Rajpootana, the country which they inhabit, is so called because the principal part of it belongs to the Rajpoot princes. Rajast'han, or 'the abode or country of princes,' is another name for the same territory, which is for the most part a mountainous country, bounded on the north by Lahore, on the north-west by Mooltan, on the west by Scinde, on the south by Guzerat and Malwa, and on the east by Agra and Delhi; but the boundaries are very irregular and not distinctly defined. The area of Rajpootana is rather larger than that of Great Britain, and the number of inhabitants is thought not to exceed three millions, the greater part of whom are Hindus, though there is a considerable number of Mohammedans. Besides the Rajpoots, the Bheels, Jains, Jauts, and Mairs are in considerable numbers. The Rajpoots, including their various tribes and branches, form a large proportion of the population of Central India. Before the Mohammedan invasion, the armies of the monarchs of Canoje and Delhi, which were chiefly composed of the Rajpoot tribe, had made partial conquests in this part of the country. They were employed to keep the turbulent in check, and to conquer the southern regions of India. On the appearance of the Mohammedan invaders, the warlike Rajpoots moved onward to the south, overwhelming the populations and taking the business of government into their own hands. Being of superior caste, the lower classes of Hindus regarded them with feelings which facilitated their usurpations.

The Rajpoot states enjoyed a sort of half independence under the Mohammedan emperors. They were compelled to pay a tribute and to furnish a military contingent, but their continual revolts led to the destruction of their principal cities. In 1748 they assumed independence, but the ruin with which they were threatened by the Mahrattas led them to seek the protection of Great Britain. An English garrison is now placed at Ajmeer, one of the principal Rajpoot towns; and although the Rajpoot chiefs are called independent princes, the military force of their country is commanded by an English officer. They have ceased to exist as a nation; their character also appears to have deteriorated, and indolence and sensuality have gained an ascendency over them. They are too proud for industrious occupations, while their bards and chroniclers rouse their passion for war and plunder—a passion which, happily, can no longer be gratified. The Rajpoots are excessively addicted to the use of opium. Sir John Malcolm mentions a practice common at the 'durbars' or councils, of some of the Rajpoot princes. The minister washes his hands, after which liquid opium is poured into the palm of his right hand, and the first in rank who is present approaches and drinks it up. Again the minister washes his hands and pours out another dose, which is drunk by the second in rank; and so until all have partaken. To drink opium from each other's hands is regarded as the most sacred pledge of friendship.

Four or five Rajpoot tribes, who, from their antiquity and their power, are considered the highest in rank, will not condescend to intermarry with those who are less distinguished, but they always marry out of the tribe. Sir John Malcolm relates an instance of their excessive family pride. The Puar Rajpoots are celebrated in the ancient history of Central India, but their power was completely crushed by the Mohammedans, and they had long ceased to rule, when a chief of this race was restored in rank and power to the seat of his ancestors. "The Puars came as the retainers of a Mahratta prince; and, what was worse, they had, while in the Deccan, eaten and intermarried with Mahratta Sudras, in consequence of which the

poorest of the Rajpoot chiefs among their dependents would have considered it a disgrace to eat with them or to give them a daughter in marriage. In cases of supposed illegitimacy, or where there exists any doubt respecting the rank of a person or family, the question can only be settled by some chief of high birth and character eating out of the same dish with those on whom the doubt rests. The pride of family among the Rajpoots is nourished by the Bhâts, or Rows, who are the chroniclers or bards of the tribe. The Rajpoots of Central India, although they pay respect to Brahmens, do not make them their priests, this office being held by the Châruns. Both they and the Bhâts boast of a celestial origin. The Chāruns are divided into two tribes; the Kachilee, who are merchants, and the Maroo, who are bards; but they do not intermarry. These two classes again are subdivided into one hundred and twenty other tribes. The Chāruns derive their power from the superstitious belief that any family who causes their blood to be shed is destined to certain ruin. The highest Rajpoot rises when a Chârun enters or leaves an assembly. The term 'Chandie' is given to their self-sacrifices. The Chârun, for example, accompanies travellers as a protection from Rajpoot robbers, and warns them off by holding a dagger in his hand. If they pay no attention to him, he stabs himself, and casts the blood from the wound upon the assailants, threatening them with future ruin. If this be still ineffectual, he again wounds himself; and if this has not the desired effect, one of the Chârun's relations, a female child or an old woman, is sacrificed. In extreme cases the Chârun kills himself, and this catastrophe is often followed by the voluntary death of his wives and children. Sir John Malcolm, in his work on Central India, says that "the aged and the young among Chāruns are taught not merely to desire to part with existence whenever the honour of the family or the class to which they belong calls for the sacrifice, but, from the feeble female of fourscore to the child of five years of age, they are eager to be the first to die." The evil consequences of a Chârun being driven to sacrifice himself are only to be averted by grants of land and gifts to his surviving relations. The power of the Bhâts, protected as they are by the superstitious veneration of the people, is very great, as they are the dispensers of fame, and those who neglect or injure them are gibbeted in satires, and other means used to degrade them. The community of Chāruns and Bhâts is said to be governed by rules so as to constitute a regular hierarchy. They are the conservators of the purity of the different Rajpoot families, and are employed to arrange nearly all marriages. By their means only, with the assistance of bribes, can a Rajpoot of low caste make an alliance with a family of greater rank. Besides the military Rajpoots, there are Rajpoots cultivators of the soil, among whom are to be found individuals connected with the higher Rajpoot families. They are all armed, and the spirit of their race is kept alive by the recitations of their bards. In the towns also there are Rajpoots who are engaged in trade or employed as servants.

The Rajpoots are a fine-looking race, and Heber states that their complexions are the fairest which he saw in India. They have fine horses, but are scarcely such showy riders as the Mussulmans. The characteristic part of their costume is the turban, which is worn of extraordinary size. A mythological emblem in gold or silver, being an embossed figure of a horse and the sun, is worn round their necks, and Sir John Malcolm says that daily adoration is paid to it. 'This indispensable figure is the first present which a Rajpoot makes to his male offspring. Another figure also worn, chiefly as a charm against evil spirits, is that of a distinguished ancestor or relation, engraved in gold or silver.

USEFUL APPLICATIONS OF THE LIME-TREE.

The *lime* or *linden tree*, though not one of the denizens of the forest which come most prominently under our notice as practically valuable trees, yet performs its part in rendering useful services to man; in other countries, perhaps more than in our own.

The lime is treated by some botanists as divisible into three species, by others into more than three, but by Mr. Loudon, in his 'Arboretum Britannicum,' into only two; and this last mode of division, so far as our object is concerned, is the most simple and convenient; it being into 'European' and 'American' limes. Each of these, it is true, is separable into varieties, such as the 'small-leaved,' the 'broad-leaved,' the 'red-twigged,' the 'cut-leaved,' the 'golden-twigged,' and the 'hairy-stiled,' among European limes; and the 'loose-flowered,' the 'pubescent-leaved,' the 'thin-leaved,' &c., among American limes: but these varieties need not engage attention here.

The European lime, which is the one chiefly applied to useful purposes, is found mostly in the middle and northern countries of Europe: one variety in Switzerland and the Alps; another in Germany and Russia; and so on. Much discussion has arisen among botanists as to whether the lime is or is not indigenous to Britain; and the point does not seem to be yet settled. The Greeks and Romans were evidently well acquainted with this tree, and Pliny speaks of it in relation to the numerous uses to which its wood was applied. It was planted by the Romans in many cases for the production of a shady grove; and indeed its beauty for this purpose has been everywhere recognised. Our early botanists placed great value on it in this respect; and Evelyn, while writing concerning it, says:—"It is a shameful negligence that we are no better provided with nurseries for a tree so choice and so universally acceptable. We send, commonly, for this tree into Flanders and Holland, while our woods do in some places spontaneously produce them." For avenues and public walks the lime-tree has been a particular favourite. Du Hamel says—"The French, growing tired of the horse-chesnut for avenues, adopted the *lime* for that purpose, in the time of Louis XIV., and accordingly the approaches to the residences of the French as well as English gentry of that date are bordered with lime-trees." The lime-trees in St. James's Park are said to have been planted at the suggestion of Evelyn. In Holland the lime is planted in towns, along the widest streets, and by the sides of the canals; and the whole country is said to be perfumed by the flowers during the months of July and August. The principal street or walk in Berlin is called 'Unter-den Linden' ('Under the Lime-trees'), from its being planted on either side with an avenue of limes. It is three-quarters of a mile in length, and leads from the Brandenburg Gate to the Royal Palace. Dr. Granville says that this street presented to his view a scene far more beautiful than he had before witnessed in France, Flanders, or Germany: it is divided into five parallel walks by rows of the trees; of which the centre walk is wholly for pedestrians, while the two nearest to the houses are used principally for vehicles. The most splendid shops in the city are found on either side of this fine street; and under the lime-trees are benches on which the citizens, in their hours of leisure, love to enjoy the shade.

It is perhaps hardly consistent to apply the term *uses* of the lime in relation to the careful tendence of

the living tree for some local or temporary object; but many such instances have been recorded, which are not devoid of interest. For instance, in the middle ages, during the struggles of the Swiss and Flemish people to recover their liberty, it was their custom to plant a lime-tree on the field of every battle that they gained over their oppressors; and many of these trees, particularly those planted by the Swiss in commemoration of their victories over Charles the Bold, are still remaining, and have been the theme of many ballads. Evelyn speaks of some large lime-trees at Basle and at Augsburg, "under whose prodigious shade they so often feast and celebrate their weddings, because they are all of them noted for their reverend antiquity; that of Basle branching out one hundred paces in diameter from a stem of about twenty feet in circle, under which the German emperors have sometimes eaten; and to such trees, it seems, they paid divine honours, as the nearest emblems of eternity." He also speaks of a lime at Neustadt, four hundred feet in the diameter of its shade, which was "set about with divers columns and monuments of stone (eighty-two in number, and formerly above one hundred more), which several princes and noble persons have adorned, and which, as so many pillars, serve likewise to support the umbrageous and venerable boughs; and that even the tree had been much ampler, the ruins and distances of the columns declare, which the rude soldiers have greatly impaired." Many of these columns bear inscriptions, some dated so far back as 1550; and the tree has suffered severely from the numerous wars to which that part of Germany has been exposed. Mr. Loudon says:—"This tree is still (1838) in existence; and, by a drawing of it made for us in 1837, by M. Abresch, a young German artist, we find that its trunk is now eighteen feet in diameter, and is surrounded by a balustrade of wood raised on a low wall coped with stone; and that its limbs are supported on one hundred and eight columns. The people of Neustadt are in the habit of sitting in this tree to eat fruit, &c.; and several gooseberry bushes have sprung up in the crevices and hollows of the bark, the fruit of which is sold to visitors." Evelyn mentions remarkable limes at Cleves, at Tillburg, at Zürich, at Bois-le-Duc, and at Schalouse in Switzerland, under which last "is a bower, composed of its branches, capable of containing three hundred persons sitting at ease: it has a fountain set about with many tables, formed only of the boughs, to which they ascend by steps, all kept so accurately, and so very thick, that the sun never looks into it." Another lime-tree is connected with a curious bequest; it is a fine old tree with enormous branches, planted in the cemetery of the hospital at Annaberg in Saxony; and the planter, who is buried under its shade, left a sum of money to have a sermon preached every Trinity Sunday under the tree.

In respect to the practical application of the lime-tree in the arts of life, the wood may be first mentioned. This wood is of a pale yellow or white colour, close-grained, soft, light, smooth, and not liable to be attacked by insects. It is used by piano-forte makers for sounding-boards, and by cabinet-makers for a variety of uses. It is turned into domestic utensils, and into small boxes for apothecaries. It is carved into toys; but the most important application of it in respect to carving is in connection with the decorations for mansions; for many of the fine carvings in Windsor Castle, Trinity College Library at Cambridge, and at Chatsworth are said to be formed of lime-wood. The blocks employed by Hollar for wood-engravings were from the same tree. The wood makes excellent charcoal for gunpowder; better than alder, and nearly equal to hazel. Baskets and cradles were formerly made from the twigs; shoemakers and glovers use planks of lime-tree upon which to cut the finer kinds of leather.

The bark is in many countries a very serviceable part of the lime-tree; since ropes, twine, and mats are manufactured therefrom. The Russian peasants weave the bark of the young shoots for the upper parts of their shoes, while the outer bark serves for the soles; and they also make of it, tied together with strips of the inner bark, baskets and boxes for domestic purposes. The outer bark of old trees supplies them, like that of the birch, with tiles for covering their cottages. In Cornwall and in some parts of Devonshire ropes are made from the bark; and the same used to be the case in Lincolnshire. The manufacture of mats from the inner bark is carried on to a considerable extent in Russia and Sweden, and is thus conducted:—Trees of from six inches to a foot in diameter are selected in the woods; and in the beginning of summer, when, from the expansion produced by the ascending sap, the bark parts freely from the wood, it is stripped from the trees in lengths of six or eight feet. These are afterwards steeped in water, till the bark separates freely into layers. It is then taken out, and separated into ribands or strands, which are hung up in the shade, generally in the wood where the tree grew from which they had been taken; and, in the course of the summer they are manufactured into the mats so much in use by gardeners and upholsterers, and for covering packages generally. The Swedish fishermen make fishing-nets of the fibres of the inner bark, separated by steeping so as to form a kind of flax. The shepherds of Carniola weave the bark into a kind of coarse cloth, which serves for their ordinary clothing: and when the bark for this purpose has been taken from the trunks, the trees are cut down during the summer, collected into open places in the woods, cut into short pieces, and burned in heaps to form charcoal.

The leaves of the lime-tree, in common with those of the elm and the poplar, were used, both in a dried and in a green state, for feeding cattle by the Romans; and they are still collected for the same purpose in Sweden, Norway, Carniola, and Switzerland: though Linnæus had remarked, in reference to Sweden, that the leaves impart a bad flavour to the milk of cows. The sap of the lime, drawn off in spring, and evaporated, is said to afford a considerable quantity of sugar; and Adanson suggested the idea of employing it for this purpose in France, along with the sap of the birch and the maple. The fruit of this tree had long been thought valueless, until Missa, a physician of the Faculty of Paris, by triturating it, mixed with some of its flowers, succeeded in procuring a kind of butter, resembling chocolate in appearance and cocoa in taste. This was done in the time of Frederick the Great, who, feeling a greater interest in the discovery than the French (the latter being in possession of cocoa-plantations in their colonies), engaged the chemist Marcgraf to test the observations of Missa. This was done, and the result seemed at first to be highly favourable; but unfortunately it afterwards proved that the new lime-tree cocoa would not keep. It has since been suggested, that if the subject had been pursued a little further, and the fruits of some of the American species of limes taken, the success would probably have been more satisfactory. If this be so, it would seem to be desirable that other attempts should be made in countries where the lime-tree grows abundantly.

The flowers are said to yield a honey superior to all other kinds in delicacy, selling at three or four times the price of common honey. Mr. Loudon states that Sir John Sinclair received from Hove, the botanist, an

account of a lime-tree forest near the little town of Kowno, on the River Niemen, in Lithuania; of the mode of managing the bees in this forest; of the mode of preparing the honey, and of making medicines and liqueurs from the honey. There is a passage in Dr. Bright's 'Travels in Hungary,' which seems to illustrate the qualities of the honey which the lime-tree yields to bees: it is quoted from Rohrer, a German writer on Hungary:—"A very interesting trade, which many of the Jews of Galicia carry on, and to which I cannot sufficiently call the attention of my countrymen, is the trade in honey. We have been desirous of knowing the secret by which M. von Ehrenberg at Vienna promises to obtain a sugar from honey devoid of its peculiar flavour. It requires no secret; nature does this in the Ukraine, in Moldavia, and in our provinces of the Buckowine, and at Sirmien. The Jews have long understood this. The distillers of rosoglio at Dantzig are known and celebrated; but perhaps it is less generally understood that this precious Dantzig-water is prepared solely from honey. As we are accustomed in Vienna to boil sugar in water, then to skim it well, and, at last, with the purified syrup to mix the spirit, so in Dantzig the same operation is performed with honey instead of sugar. The Jews of Galicia send honey, which has all the properties of sugar, as white and hard as sugar itself, in casks containing six centners, each centner worth twenty-five guldens and a half in Moldavia. The manipulation which this undergoes in Moldavia is simply to expose the honey, purified from its wax, during some weeks in the winter, to the open air; it then becomes hard, and as white as snow. The bees have here an opportunity, as in Ukraine, of feeding in the *lime-forests;* and from the blossom of this tree, and that of the vine, they extract a honey, at first yellow, but afterwards becoming the hard white substance of which many hundred centners are purchased every year by the Jews, and forwarded to Dantzig. The most celebrated distiller in Galicia, Leib Mimeles, at Lemberg, from whom the Italian dealers themselves purchase rosoglio, has no other sugar or syrup in his whole cellar than that procured from honey. Of this he has always many casks in store. He takes out a piece of this honey, boils it in water, and skims it, and after this the honey-water does not again spontaneously harden. The Jews employ this syrup in their spirits, without impairing the transparency or imparting any peculiar flavour. The white hard honey is also much used in Moldavia with coffee."

Of the American limes we need not enter upon any descriptions; since the useful applications of the wood and other parts are very limited, and are, so far as they go, similar to those which have already engaged our attention.

A Storm in the Polar Sea.—No language, I am convinced, can convey an adequate idea of the terrific grandeur of the effect now produced by the collision of the ice and the tempestuous ocean. The sea violently agitated and rolling its mountainous waves against an opposing body, is at all times a sublime and awful sight; but when, in addition, it encounters immense masses, which it has set in motion with a violence equal to its own, its effect is prodigiously increased. At one moment it bursts upon these icy fragments, and buries them many feet beneath its wave; and the next, as the buoyancy of the depressed body struggles for reascendency, the water rushes in foaming cataracts over its edges; whilst every individual mass, rocking and labouring in its bed, grinds against and contends with its opponent until one is either split with the shock or upheaved upon the surface of the other. Nor is this collision confined to any particular spot: it is going on as far as the sight can reach; and when, from this convulsive scene below, the eye is turned to the extraordinary appearance of the blink in the sky above, where the unnatural clearness of a calm and silvery atmosphere presents itself, bounded by a dark hard line of stormy clouds, such as at this moment lowered over our masts, as if to mark the confines within which the efforts of man would be of no avail, the reader may imagine the sensation of awe which must accompany that of grandeur in the mind of the beholder.—*Beechey's Voyages towards the North Pole.*

Petersburg by Moonlight.—He who hath not seen Petersburg by moonlight hath something yet to see. Yes, it is when the moon is seen climbing over its domes and minarets, that one is reconciled to the idea of a deserted city. It is this separation of the inanimate from the animate which gives it this peculiar interest. Dazzling as it may appear, lit up by the beams of a meridian sun, its magnificence then involves the idea of its population; but this in nowise tallies with the magnitude of its buildings, so that the admiration of the grandeur of the one is checked by the insignificance of the other. But when, in the dead of night, when all may be supposed to be asleep—when the mind may imagine that the noonday bustle shall be worthy of the inanimate structures which now shine resplendent in the softened light of the watery moonbeam—then, left to solitary contemplation, free from the influence of any outward impression which may destroy its fairy and ideal form, then the city of the Czars offers a spectacle which perhaps few or none can equal. It has then something of antiquity in its appearance. Its colossal buildings lit up by the reflected moonbeam, we see but their form only, without having sufficient light to scan their features. The buildings may be of stone or marble, and rival, for aught we know, the Eternal City in their age. Viewed from an elevation, extending along a wide extent of horizon, and flanked by massive buildings of monastic form, the town rises with its gilded spires and spangling cupolas from out a level plain. We see not by the faint moonlight, that the intervening spaces between these large structures are not filled up. The wide and straight streets allow not the eye to reach the tapering perspective point in the distance. Some bridge or object interposes ere the long alley dwindle to a point. The surface of the ground is one white spangling carpet. The river flows not to the sight: the voice of the boatman is not heard, and his oar plies not. Some solitary chime indicates the hour. The moon descending in her course, leaves some tower in the shade. All contributes to heighten the feelings of admiration which this hour inspires. The day breaks, and dispels much of the illusion, revealing that to be but brick and plaster which to our midnight contemplation appeared stone and marble. Now time and duration vanish—the whole but of yesterday's creation, and nothing which guarantees futurity. The imagination, which had deceived itself into a past, is now disenchanted. The light of day discovers plains and wastes in the centre of a habitable city. The inhabitants, thinly scattered or lost over a wide extended surface, fail to enliven its streets. And what say those edifices to us which form its grandeur? None of the *vis admonitionis in locis*—the *sine nomine saxum*,—the history of a century—a town which we see upon the stage, called into existence by harlequin's wand, which can again say depart—still a great city—the triumph of art over nature, and yet in its cradle.—*Life of a Travelling Physician.*

Business in Cairo.—Wheat is ground in Cairo in small mills worked by buffaloes or oxen. The business of the baker is somewhat different from the same calling with us. The loaves are usually made ready by the customers, and brought at stated hours, once or twice in the day, to the baker, who places them in his oven, which is always kept heated, and in a few minutes returns them sufficiently baked, for which he receives a small sum. I had to advance money to the baker to purchase flour, as he would not incur such a risk himself, and also to pay him in part in advance for his labour. I inquired why he was so cautious, as he would have the bread for his security till he should receive his pay. His reply was, that he wanted money and not bread, and that I might only intend to make a fool of him. I found this to be the usual practice with tradesmen, who will not do work to the amount of a few piasters without receiving a part of the pay in advance. I sent my boots to a shoemaker to be repaired, by my servant; who soon returned and asked for four or five piasters, without which the man refused to undertake them.—*Travels in Egypt, Arabia, &c., by the Rev. Stephen Olin.*



MADRID.

Madrid, the capital of New Castile and of Spain, and now also of the province of Madrid, stands on a range of small hills rising in the middle of the extensive plain of New Castile, which is bounded on the north by the mountains of Guadarrama, and on the south by those of Toledo, in 40° 24′ 18″ N. lat. and 3° 42′ W. long. of Greenwich. Madrid is supposed to occupy the site of the Mantua Carpetanorum of the Romans, which was called Majoritum by the Goths, whence its present name Madrid is derived. Some antiquarians contend that it was so called by the Spanish Arabs, in whose language the word *Magerit* meant "a well-aired house."

During the occupation of the peninsula by the Arabs the place served as a frontier town, and its castle was often taken from the Arabs and retaken by them until 1086, when it was finally taken by Alphonso VI., the conqueror of Toledo, who annexed it to the bishopric of Toledo, to which it now belongs. It continued to be a mere village until the reign of Henry III. of Castile, who, being passionately fond of hunting the wild boar and the bear, both which animals were then abundant in the mountains near Madrid, made the place his residence during the hunting-season. Charles V. occasionally lived in it, and it was at last made the capital of the Spanish dominions by his son Philip II., in opposition to the opinion of his ministers, who strongly advised him to fix his court at Lisbon.

Madrid is more than 2000 English feet above the level of the sea, a circumstance which accounts for the coldness of its winters. In summer the heat is excessive, in some measure owing to the want of trees in the neighbourhood. The thermometer in 1837 rose to 117° of Fahrenheit in the open air. In winter the same thermometer sometimes descends as low as 18°.

Madrid is on the left bank of the Manzanares, a small rivulet which has its rise in the mountains of Guadarrama, about thirty-six miles from the capital, and which, after flowing under the walls of Madrid, joins the Xarama, a considerable stream, at some distance from the capital. Two majestic bridges, called Puente de Toledo and Puente de Segovia, are thrown over the Manzanares; but such is the contrast between the imposing grandeur of these bridges and the scanty stream which flows beneath them, that it has given rise to the witty saying "that the kings of Spain ought to sell the bridges, and purchase water with the money." In winter, however, the heavy rains, and in spring the sudden melting of the snow on the neighbouring mountains, sometimes swell the Manzanares into an impetuous torrent.

Madrid is surrounded by a brick wall twenty feet high, which contains fifteen gates, mostly built of coarse grey granite. Among these the gate of Alcalá and that of San Vicente, built in the reign of Charles III., and that of Toledo, erected in the reign of Ferdinand VII., are characterised by purity of design and solidity of structure. During the present civil war, some slight fortifications have been erected on the principal points leading to the city.

The general aspect of Madrid from all the approaches is anything but inviting. The numerous fantastic spires of churches and convents, the tiled roofs of the houses, the sterility of the neighbourhood, and the total absence of good houses, pleasure-gardens, or other buildings which indicate the approach to a great city, give to the capital of Spain the most gloomy and forbidding appearance.

The interior, however, is not devoid of beauty. The wide and well-paved streets, the extensive and well-planted public promenades in and near the city, with the fountains in many of the squares, the gorgeous churches, and handsome public buildings, remind the traveller that he is in the capital of Philip II. The houses are well constructed: the foundations and some of the ornamental parts are of granite, and the rest of red brick, stuccoed and generally painted. Each house is four or five, and frequently six stories high, and contains, as in Paris, several families. The principal streets, with few exceptions, are moderately wide

and handsome: that of Alcalá, for instance, is wider than Portland-place in London, and contains many splendid buildings The Calle Mayor, Carrera de San Geronimo, Calle de Atocha, &c. would be ornaments to any capital; the rest of the streets are generally narrow and crooked. There are forty-two squares, of which the principal are—that of the Royal Palace; that of Santa Catalina, where a beautiful bronze statue of Cervantes has been lately placed; the Puerta del Sol, where the five principal streets of Madrid meet, and which is a place of resort both for the idle and the busy, being the spot where, owing to the proximity of the Exchange, or Bolsa, all commercial transactions are conducted in the open air: the Plaza de la Cevada, where criminals were formerly executed; and lastly, the Plaza Mayor, which is the finest of all. This square is now used as the rallying-point for the garrison of Madrid in case of alarm, on account of the strength and solidity of the buildings and the difficulty of approaching it through the narrow crooked streets. Its form is quadrilateral, four hundred and thirty-four feet by three hundred and thirty-four, and it is surrounded with stone buildings six stories high, ornamented with pillars of grey granite, which form a fine piazza all round.

The population of Madrid, as to which no official returns have been published since 1807, was stated by Miñano to be 201,344 in 1826, but this number is generally supposed to be too great for that time, although it may at present be nearly correct. The circumference of Madrid is not above five miles; and there are no suburbs.

The royal palace of Madrid, though unfinished, is one of the finest royal residences in Europe. The interior is decorated in a style of costly magnificence. It stands on the site of the old Alcazar, or palace, inhabited by Philip II., which was burnt to the ground in 1734. Philip V. began the building, which was continued by his successors. It has four fronts, four hundred and seventy feet in length, and one hundred feet high. The custom-house, a noble building, erected by Charles III., to whom Madrid is chiefly indebted for its embellishments; the Casa de Correos (post-office) in the Puerta del Sol; the palace called de Buena Vista, formerly belonging to the dukes of Alba, now converted into an artillery museum; the royal printing-office, in the street of Carretas, and the palace of the Duke of Berwick, are among the public and private buildings which adorn the capital. Among the numerous churches and convents which fill the streets of Madrid, scarcely one can be mentioned as a specimen of a pure style of architecture. That of San Isidro, formerly belonging to the Jesuits, has a very fine portal; the convent of the Saleras, founded by Ferdinand VI. and his wife Barbara, is likewise a fine building, and the interior of the church is ornamented with the richest marbles. The convent of San Francesco el Grande, built in 1777, is justly admired for the severity and correctness of the design, its beautiful proportions, and a dome built in imitation of that of Saint Peter's at Rome.

There are sixty-seven churches in Madrid, exclusive of private chapels. Before the year 1834 there were sixty-six convents, thirty-four for men and thirty-two for women. Some of them have been recently pulled down, either to widen the streets or to form squares; others have been converted into barracks, hospitals, magazines, and government offices.

Public promenades abound in Madrid. That which is most resorted to is the Prado, which consists of various alleys lined with double rows of trees, and ornamented with beautiful marble fountains. Adjoining to it is the Retiro, an extensive and beautiful garden. The garden suffered greatly, both from friends and foes, during the Peninsular war, but was restored by the late king, who added to it an extensive menagerie Another favourite promenade is a vast plantation outside the gate of Atocha, called Las Delicias, leading to a canal known by the name of Canal de Manzanares. This canal, which extends only six miles from Madrid, was intended to unite the capital with the river Tajo at Toledo, by means of the Xarama.

The literary and scientific establishments are generally of old date, and insufficient to meet the wants of the present day. Miñano mentions one hundred and sixty-six primary schools as existing in 1826, besides two colleges, both conducted by ecclesiastics. This number, however, has recently diminished. There are two extensive libraries open to the public; one founded by Philip V. in 1712, which contains one hundred and fifty thousand volumes, besides a very large collection of manuscripts, chiefly Greek, which have been described by J. Iriarte, and a museum of medals and antiquities. The library of San Isidro belonged formerly to the Jesuits. Both have been considerably increased of late by the addition of the libraries of the suppressed convents within the capital. There are also four academies: 1. 'La Academia de la Lengua,' founded in 1724, in imitation of the Académie Française, confines its labours to the publication of works in the Spanish language, such as grammars and dictionaries, and to editions of the best Spanish writers. 2. The Academy of History originated in a society of individuals whose first object was the preservation of historical records. It was confirmed by Philip V., who, in 1738, granted the present statutes. The labours of this body have been far more useful than those of its sister institution: and the nine volumes in quarto already published by them form a valuable addition to the history of Spain. 3. The Academy of the Fine Arts, instituted in 1738, holds weekly meetings at its rooms in the street of Alcalá, but it has hitherto done little or nothing: lastly, the Academy of Medicine. A fine botanical garden, well stocked with exotic plants, forms a delightful spot in the spring, when it is much frequented: attached to the establishment are various professors, who lecture upon botany, agriculture, and geology. The Museum of Natural History, in the Calle de Alcalá, is not worthy of the praise bestowed upon it by travellers: it certainly contains a splendid collection of minerals from the Spanish dominions in America, but they are badly arranged and worse kept. It contains, however, the interesting skeleton of the Megatherium described by Cuvier.

Along the east side of the Prado is the National Gallery, a noble building of colossal dimensions, with a beautiful Tuscan portico and Doric colonnades. The collection of paintings which it contains has been lately pronounced by competent judges to possess a greater number of good pictures, with fewer bad ones, than any other gallery in Europe. The Armoury, a fine building of the time of Philip II., contains some of the most beautiful specimens of armour in Europe, especially of the *Cinque Cento*, or the fine times of Benvenuto Cellini. There are several complete suits of armour, which formerly belonged to Ferdinand V., Charles V., the Great Captain, John of Austria, Garcia de Paredes, and other illustrious Spaniards. The most interesting of all perhaps is a coat of mail with the name and the arms of Isabella upon it, which she is said to have worn in her campaigns against the Moors. An account of this collection, with drawings of the best pieces of armour, is now in course of publication.

Madrid has two small theatres, 'La Cruz' and 'Principe,' both managed by the Ayuntamiento, or municipal corporation, where Italian operas and Spanish plays are alternately acted. Another, of much larger dimensions, called the 'Teatro de Oriente,' has been lately

built in the centre of the square opposite to the royal palace, but is still unfinished for want of funds.

The inhabitants of Madrid repair, every Monday during the season, to a vast amphitheatre outside of the gate of Alcalá, where the favourite spectacle of bull-fights is exhibited.

The police of Madrid is not good. The streets are generally dirty, and the approaches to the city sometimes blocked up by heaps of rubbish. The city has no common sewers. Notwithstanding the great number of fountains, the want of good water is severely felt in summer. The city itself is considered to be extremely unhealthy; and if Philip II. chose it for his residence on account of the purity of the air and the quality of its waters, as we are told, Madrid must have undergone a complete change since that time. The sharp winds which blow from the Guadarrama mountains in winter produce the endemic pulmonia or pneumonia, which often proves fatal in a few hours. A sort of colic, caused by the dryness of the atmosphere, is likewise a prevalent complaint in summer.

Charitable and benevolent institutions are numerous, and some are amply provided with funds; but the management having always been in the hands of the clergy, the funds have been spent in building monasteries and churches, rather than applied to the charitable purposes intended by the donors. An institution, supported by voluntary contributions and patronised by the government, has recently been established outside of the city, for the reception of beggars, who were formerly objects of horror and disgust in the streets of Madrid.

Madrid has little manufacturing industry. A manufacture of porcelain and another of tapestry are both the property of the crown.

JUDICIAL ASTROLOGY.

[Continued from p. 368.]

PART II.

We must now briefly notice the aspects, houses, habitudes, and other influential relations of the planets.

As these portentous bodies make the circuit of their orbits with different velocities, their relative positions are continually changing, by which mutation of place certain configurations occur among them, arising from their different longitudes measured on the ecliptic; these are called their aspects, and are of great importance in astrology. The good and evil effects of these aspects on mundane affairs appears to have been founded on the notion that the planets radiate their influence in right lines, and as these impinge against and intermingle with each other from different angles, harmonious or discordant effects are produced. Kepler, who added eight to those previously known, defines an aspect to be the angle formed by the rays of two planets meeting upon the earth, whereby their good or bad influence is determined. What influence at all, and particularly what moral influence could possibly be effected, no attempt was made to show—all was mere assumption.

The five principal aspects are the Sextile, Quartile, Trine, Opposition, and Conjunction. The Sextile ✶, or hexagon, is when the planets are two signs, or 60°, from each other, and is a friendly aspect. The Quartile □, square, quadrate, or, as it is sometimes called, tetragon, a baneful aspect, is when they are three signs, or 90°, apart. The Trine △, or trigonal, when they are four signs, or 120°, distant, is an aspect of the most perfect love and amity. The Opposition ☍, when six signs, or half a circle, from each other, and is an aspect of perfect hatred and enmity. The Conjunction ☌, improperly called an aspect, because the planets, being in the same degree in the ecliptic, have no distance from each other, is good with the benign planets, and evil with the malign.

Aspects may be dexter or sinister, partile or platique. The sinister falls according to the succession of the signs, and the dexter contrary. Dexter aspects are the most powerful and efficacious. Partile aspects are when planets are in the same degrees and minutes of the signs. Platique aspects are when planets are within orbs; thus, the half of Saturn's orb is 5°, the half of Mars's 3° 45′, whence it results that the platique aspect of Saturn and Mars continues until they are 8° 45′ distant from their true aspect.

The opposition of Saturn is the most hateful and deadly of all the aspects. In the nativity of a king, the opposition of Saturn to the mid-heaven, or tenth house, is most inauspicious, as it denotes dethronement and an unfortunate end. The conjunction, quartile, or opposition of Mars and the Moon from angles of the figure, portends a violent death. The trine aspects of Jupiter and Venus are the most fortunate that can occur. Venus and Mercury in conjunction in an airy sign in the ascendant, and in trine to Jupiter, make the most famous scholars and the most learned critics. Mars in opposition to the ascendant makes a knave.

Planets squaring and opposing each other from angles and cardinal signs portend much evil to the native during his life, and at last a violent death. The conjunction, quartile, or opposition of Saturn and the sun from angles portends a violent death. The opposition or quartile of Mars and Mercury induces a keen, sarcastic, and turbulent wit. The opposition of Saturn and Mars from the equinoctial signs makes a tyrant.

The partile aspects are much more efficacious than the platique. The partile conjunction ☌ of a planet with Jupiter or Venus give five fortitudes. The partile trine △ with ♃ or ♀, four fortitudes. The partile ☌ with Saturn or Mars gives five debilities. The partile ☍ with ♄ or ♂, four debilities.

There are a great variety of other circumstances by which the planets are affected, such as retrogradation, direction, separation, prohibition, peregrination, reception, translation of light, collection of light, combustion, void of course, stationary, &c.

Planets are essentially dignified when situated in their own houses, of which we must now take some notice. Each planet has two houses, one diurnal, the other nocturnal,—except Sol and Luna, who have only one each to serve them for day and night; and when either of these houses is on the eastern horizon, the owner is the lord of the ascendant. and significator of the person whose nativity occurred during that time.

Planets have their fall in signs that are opposite to their exaltations, and their detriment in signs that are opposite to their houses.

By this appropriation or preoccupancy of the twelve signs by the seven ancient planets, the five modern Asteroids are made houseless wanderers.

We are informed that it was the Egyptians who first discovered what planet ruled each day. Thus the Sun presides over Sunday, the Moon over Monday, Mars over Tuesday, Mercury over Wednesday, Jupiter over Thursday, Venus over Friday, and Saturn over Saturday. The more modern astrologers share the hours also among the planets in the following manner:—☉ reigns over Sunday, because he rules the first hour after sun-rise, ♀ rules the second hour, ☿ the third, ☽ the fourth, ♄ the fifth, ♃ the sixth, ♂ the seventh, ☉ the eighth, ♀ the ninth, ☿ the tenth, ☽ the eleventh, ♄ the twelfth, and so on. But as there is a great inequality in the length of the days and nights, reckoned from sun-rise to sun-set, there will be a proportionate difference in the length of the planetary hours. When the day is eight hours and a half long,

the length of the planetary hour by day will be $42^m\ 30^s$, and by night $1^h\ 17^m\ 30^s$.

Besides those already noticed, there are a great variety of other incidental circumstances by which planetary influence may be strengthened, weakened, or otherwise affected. And this affords a wide range to the astrologer, even if self-deceived as to the truth of his art, to modify his predictions according to the known parts of the case under consideration.

The most important planet in a nativity is the *lord of the ascendant*. The ascendant is that sign of the zodiac which is rising above the horizon, and which is then said to be on the cusp of the first house, or that boundary-line which divides the first and the twelfth. If, at the time of any person's nativity, Virgo, one of the houses of Mercury, be rising, then ☿, as lord of the ascendant, will be the significator of such person's character and fortunes.

But it may happen that another planet has greater essential dignities than the lord of the ascendant, and the planet thus dignified is called *almuten* of the figure, and may, it appears, claim a share in the government with the reigning lord. A remarkable instance of this occurred in the geniture of Henry VIII. of England, as set forth by the learned Carden. Blagrave says:—"In this nativity we find the sign ♍ to ascend, of which ☿ is the lord, yet neither the sign ascending nor the lord thereof personate or describe the king's person, qualities, or natural inclinations, for he is clearly under Mars, and martially inclined; the reason thereof is, because Mars is almuten of the figure, as having most essential dignities in the ascendant, mid-heaven, and place of the luminaries: yet, notwithstanding, he might and did somewhat partake of the nature of ☉, ☿, and ♀; for ☿ is in the house of ☉, and ☉ in his terms; ☿ is also in ⚹ to ♀, and she in platique △ to the ascendant, and the luminaries in angles; all which might well signify the loftiness of his fancy and his spirit. This is one of the most remarkable circumstances that could have occurred in a horoscope, and is a palpable contradiction of one of the principal rules in astrology. The Abbé Pluche has observed that astrologers always find the means of getting out of difficulties and avoiding contradictions by alleging that the interposition of some planets changes the influence of others.

It is the usual practice with the professors of astrology, when the precise time of a person's birth is not known, to *rectify the nativity* so as to make the ascendant and its lord agree with the person and character of the native. Now, in the nativity cited above, a lapse of about four hours would have made Scorpio the ascendant, of which Mars would have been the lord; and as Scorpio gives a strong able body, with the face broad or square, and the neck thick and short, and as Mars gives a strong able body, with a confident countenance, a bold lofty undaunted spirit, sandy, flaxen, or red hair, and also denotes princes self-willed and ruling by oppression, the sign ascending and its lord would very well describe the person and character of the burly monarch; but the time of Henry's birth was too well known to admit of such a rectification, and Carden, perhaps as much from inclination as necessity, acted honestly.

It would be difficult to select a sign and a significator less descriptive of Henry's person and qualities than Virgo and Mercury. We have already seen what sort of a person Mercury describes, and Virgo denotes "a person of a mean height, a slender stature, hair black or dark brown, a small shrill voice, all the members inclining to brevity, and the person signified hereby is discreet and well spoken, very studious and given to all kinds of learning."

From what has already been said, it will be evident that the planets perform principal parts in the astral drama; but it must not be supposed that they are the only actors, for there are three others, who, though in some respects subordinate, occasionally play parts of considerable weight and interest. These are the Dragon's Head ☊, the *Dragon's Tail* ☋, and the *Part of Fortune* ⊕. The Dragon's Head and Tail are the two points where the plain of the Moon's orbit intersects the plane of the ecliptic, and are called her *nodes*. The node by which the Moon ascends above the plane of the ecliptic northward is the Dragon's Head, and the opposite node is the Dragon's Tail.

The ☊, according to Gadbury's 'Astrological Thesaurus,' partakes of the nature of Jupiter and Venus, but is not so efficient, being variable, like Mercury, that is, good with the good, and evil with the bad. The ☋ is malignant, but not so intensely so as Saturn and Mars, and is contradistinguished from the ☊ by a strange perversity of disposition, being good with the evil, and evil with the good. But the Part of Fortune ⊕—what is the Part of Fortune? This is a question not very easily answered. It may, however, be defined to be a *point* in the ecliptic, having relation to the sign, degree and minute of the Sun's place; the sign, degree, and minute of the Moon's place; and the sign, degree, and minute that is on the cusp of the first house or ascendant. The rule for finding the place of the ⊕ is as follows:—Subtract the number of the signs (reckoned from Aries), degrees, and minutes of the Sun's place from those of the Moon, and to the difference add the sign, degree, and minute of the ascendant, and the result will give the sign, degree, and minute of the place of the ⊕. But should the signs, degrees, and minutes of the Sun be more than those of the Moon, then the whole circle, or twelve signs, must be added to the Moon's place. For example, suppose the Moon's place to be in 20° 45′ of Virgo, then (♍ being the 5th sign from ♈) the Moon's signs, degrees, and minutes will be 5^s 20° 45′, and supposing the Sun to be in 23° 14′ of ♑, the 9th sign from ♈, his signs, degrees, and minutes will be 9^s 23° 14′, and if we further suppose 12° 31′ of Gemini, the 2nd sign from ♈, to be on the cusp of the ascendant, then we must proceed in the following manner:—The Moon's signs being less than those of the Sun, the whole twelve signs must be added.

Locus	☽ 17^s	20°	45′,	with the 12 signs added.
	☉ 9	25	14	
Difference	7	27	31	
Ascendant added	2	12	31	
Locus ⊕	10	10	2,	viz., in 10° 2′ of ♒, the 10th sign from ♈.

The ⊕, like the planets, is susceptible of fortitudes and debilities. There are fifteen different situations in which it may be fortified, and thirteen in which it may be debilitated.

The ⊕ is of great importance in the art of resolving horary questions. For instance, if a person wishes to know to what quarter of the world he should direct his course in order to obtain wealth, you must see what quarter of the heavens the lord of the second house (the house of wealth) and the ⊕ are in, and direct him accordingly. If the question be respecting the safety of a voyage, then the lord of the second house, remote from that location, and the ☽ and the lord of the ⊕ removed from the ⊕ or in opposition to it, denotes want of victuals, and the common necessaries of life for seamen and passengers: if in watery signs, a scarcity of water.

On what relation of analogy, or connection between the ⊕ and the affairs of this world, the hypothesis of the influence of the former over the latter is founded, it is impossible to imagine: it is too deep

"For the brief fathom line of thought or sense."



SIR ROGER DE COVERLEY.—No. VIII.

Addison, after a long interval in the production of his papers on the worthy knight whom he had adopted for his own, brings him to London. His character will now be brought out under new aspects. The following passages are from the 'Spectator,' No. 269.

'I was this morning surprised with a great knocking at the door, when my landlady's daughter came up to me, and told me that there was a man below desired to speak with me. Upon my asking her who it was, she told me it was a very grave elderly person, but that she did not know his name. I immediately went down to him, and found him to be the coachman of my worthy friend Sir Roger de Coverley. He told me that his master came to town last night, and would be glad to take a turn with me in Gray's Inn walks. As I was wondering with myself what had brought Sir Roger to town, not having lately received any letter from him, he told me that his master was come up to get a sight of Prince Eugene, and that he desired I would immediately meet him.

"I was not a little pleased with the curiosity of the old knight, though I did not much wonder at it, having heard him say more than once in private discourse, that he looked upon Prince Eugenio (for so the knight always calls him) to be a greater man than Scanderbeg.

"I was no sooner come into Gray's Inn walks, but I heard my friend hemming twice or thrice to himself with great vigour, for he loves to clear his pipes in good air (to make use of his own phrase), and is not a little pleased with any one who takes notice of the strength which he still exerts in his morning hems.

"I was touched with a secret joy at the sight of the good old man, who, before he saw me, was engaged in conversation with a beggar-man that had asked an alms of him. I could hear my friend chide him for not finding out some work; but at the same time saw him put his hand in his pocket and give him sixpence.

"Our salutations were very hearty on both sides, consisting of many kind shakes of the hand, and several affectionate looks which we cast upon one another. After which the knight told me my good friend his chaplain was very well, and much at my service, and that the Sunday before he had made a most incomparable sermon out of Dr. Barrow. 'I have left,' says he, 'all my affairs in his hands, and being willing to lay an obligation upon him, have deposited with him thirty marks, to be distributed among his poor parishioners.'

"He then proceeded to acquaint me with the welfare of Will Wimble. Upon which he put his hand into his fob, and presented me, in his name, with a tobacco-stopper, telling me that Will had been busy all the beginning of the winter in turning great quantities of them; and that he made a present of one to every gentleman in the country who has good principles, and smokes. He added, that poor Will was at present under great tribulation, for that Tom Touchy had taken the law of him for cutting some hazel-sticks out of one of his hedges.

"Among other pieces of news which the knight brought from his country-seat, he informed me that Moll White was dead, and that about a month after her death the wind was so very high that it blew down the end of one of his barns. 'But for my own part,' says Sir Roger, 'I do not think that the old woman had any hand in it.'

"He afterwards fell into an account of the diversions which had passed in his house during the holidays: for Sir Roger, after the laudable custom of his ancestors, always keeps open house at Christmas.

"I learned from him that he had killed eight fat hogs for this season; that he had dealt about his chines very liberally amongst his neighbours, and that in particular he had sent a string of hogs'-puddings, with a pack of cards, to every poor family in the parish. 'I have often thought,' says Sir Roger, 'it happens very well that Christmas should fall out in the middle of winter. It is the most dead uncomfortable time of the year, when the poor people would suffer very much from their poverty and cold, if they had not good cheer, warm fires, and Christmas gambols to support them. I love to rejoice their poor hearts at this season, and to see the whole village merry in my great hall. I allow a double quantity of malt to my small-beer, and set it a running for twelve days to every one that calls for it. I have always a piece of cold beef and a mince-pie upon the table, and am wonderfully pleased to see my tenants pass away a whole evening in playing their innocent tricks, and smutting one another. Our friend Will Wimble is as merry as any of them, and shows a thousand roguish tricks upon these occasions.' . . . .

"Having passed away the greatest part of the morning in hearing the knight's reflections, which were partly private and partly political, he asked me if I would smoke a pipe with him over a dish of coffee at Squires's. As I love the old man, I take delight in complying with everything that is agreeable to him, and accordingly waited on him to the coffee-house, where his venerable figure drew upon us the eyes of the whole room. He had no sooner seated himself at the upper end of the high table, but he called for a clean pipe, a paper of tobacco, a dish of coffee, a wax-candle, and the 'Supplement,' with such an air of cheerfulness and good humour, that all the boys in the coffee-room (who seemed to take pleasure in serving him) were at once employed on his several errands, insomuch that nobody else could come at a dish of tea until the knight had got all his conveniences about him."

THE USES OF STRAW.

It perhaps seldom occurs to the minds of those even who are in the habit of using straw every day, or it may be almost every hour in the day, how exceedingly diverse and even apparently incompatible are the uses to which that commodity is applied. As a food for cattle and horses, as a litter or absorbent for the refuse of stalls and stables, as a covering for the roofs of houses, as a material for hats and bonnets, as a substitute for feathers in beds and mattresses—straw is presented to our notice in a variety of forms, which merit a little attention.

Sir John Sinclair, in one of his agricultural works published some years ago, collected the opinions of many practical persons as to the relative values of straw when used as *fodder* and when used as *litter*; and it is not a little curious to see the diversity in these opinions. One writer observed, that "If a Yorkshire farmer and a Norfolk farmer got equal quantities of straw, the Yorkshireman would make his cattle eat almost every particle, and would scarcely leave any to litter the stalls with; whilst the Norfolk-man would convert the whole into manure." Such differences were observable, in a smaller degree, between the individual opinions of various persons, and seem to rest partly on the kind of husbandry most prevalent in the district. Sir John gives a few remarks on straw in reference to the weight produced from average crops of grain—the relative values of different kinds—and the uses to which straw is applied, as fodder, litter, thatch, and a material for manufactures.

The weight of straw produced from one acre of grain seems to depend on different circumstances—the species of grain; the variety of the species employed; the dryness or moisture of the season; the quality of the soil; the season when the seed is sown; and the manner in which the straw is cut. From estimates collected in different quarters, relative to the straw of wheat, beans, peas, oats, and barley, and under various circumstances, Sir John came to an opinion "that on an average of years, well-cultivated and fertile soils, when the crop is carefully cut down, will annually produce, on the average of the crops above mentioned, and taking the average of the kingdom, one ton five hundredweight of straw per English acre."

The price of straw depends a good deal on the vicinity of towns; and it has sometimes happened that the price, under such circumstances, is so high, that innkeepers have chosen to litter their horses with hay, as a matter of economy. In some parts of the country oat-straw sells at a higher price than that of wheat; while in others wheat-straw commands the higher price, according to the circumstances under which the district is placed.

In former times the feeding of cattle was the great object to which straw was applied, almost every blade being devoted to that purpose, and scarcely any left to litter the stalls. This was succeeded by an opposite extreme; the straw being used almost entirely for litter, and scarcely at all as fodder. But a medium

course is now more prevalent, modified and regulated by the kind of straw produced. Thus wheat-straw, from its strength, is well calculated both for litter and for thatching; and when cut into chaff, it is also used much as fodder. In Scotland it is often steamed with potatoes, and in that form given to cattle and horses. When used uncut, or in the whole state, oat-straw is deemed better than wheat-straw as fodder; and during the winter season oat-straw is very generally used in many counties of Scotland instead of hay. Barley-straw is in many districts condemned as bad fodder for cattle; but the ancients are stated by Pliny to have preferred barley-straw to wheat-straw for this purpose; a circumstance which Sir John Sinclair accounts for by supposing the barley to have been better harvested in the fine climate of Italy: and indeed in some English districts barley-straw, when well harvested, is preferred to some others. Bean-straw, used either with oats or with peas-straw, is eaten in many counties by cattle and working horses in the winter season.

In respect to the use of straw as litter, it may be considered as having two objects in view—the formation of a bed in which the animal may lie down, and an absorbent for animal refuse, afterwards to be used as manure. This littering is effected in four different ways—in stalls or stables, in hammels, in fold-yards, and in open folds. The "hammels" are sheds with small folds holding only two or three cattle each. Each of these four modes of littering has its advocates and its opponents, in respect to the expense at which the plan can be worked out, the health of the animals exposed to it, the kind and quantity of straw used in the litter, and the quantity and value of the manure resulting from it; but these are details of practical husbandry into which it is not the purpose here to enter.

In respect to the employment of straw as thatch for cottages, it may be remarked that the kinds used for this purpose are not such as are commonly consumed as fodder, and therefore the value of the straw employed is, to the grower, either the price he could obtain for it in the market, or the value of the litter that could be made from it. All the circumstances connected with thatching have, however, been pretty fully discussed in two articles in a former volume of the 'Penny Magazine' (1840, pp. 93 and 100); and to those we may refer for details.

Straw is employed in a few minor agricultural operations. In Essex and some other counties it is used for the purpose of under-draining; the straw being twisted into a kind of rope, and put into the hollows. In draining with stones, straw is sometimes laid above the stones, before the earth is thrown in, to prevent it from getting down. Straw is used for covering hay and corn stacks; and where it is the practice to cut the wheat-crops at a great height, the stubble is mown afterwards, close to the ground, and collected for that purpose. In some parts of Scotland straw mixed with clay is used for building the walls of houses and gardens, and for roofing houses in lieu of thatch.

As regards manufactures, common straw, as well as bean-halm, used formerly to be burned at a potash manufactory near Gloucester for the sake of the ash; but we believe this plan is not much acted on at present. Straw is much used by saddlers in the collars for horses; and in some country districts the entire collar is made of straw. Straw is used as a stuffing for mattresses, paillasses, and other articles of furniture; and the chaff of oats is so well fitted for this purpose, that chaff-beds are very prevalent among the humbler class of inhabitants in Scotland. Chaff-paper has more than once been attempted to be manufactured; and the Neckinger Mills at Bermondsey were erected for this purpose sixty or seventy years ago; but the attempt does not seem to have been successful.

But the most important use of straw in the manufacturing arts is as a material for hats and bonnets. Extensive as is this manufacture, it is not supposed to have been carried on as a separate branch of trade until within seventy or eighty years; for the wives and daughters of the farmers used to plait straw for making their own bonnets. A notice of the straw-plait manufacture divides itself into two varieties—British and foreign; and for a few details respecting these we shall be indebted to M'Culloch.

The district of England in which straw-plait is made comprises the counties of Bedford, Hertford, Buckingham, and parts of Essex and Suffolk, being the counties most favourable for the production of wheat-straw. During the late war, the importation of straw-hats from Leghorn having in a great measure ceased, an extraordinary degree of encouragement was given to the domestic manufacture in England, and a proportional degree of comfort was derived by the agricultural labourers in these places, by whose wives and children it was principally followed. This activity led to competition; and the competition led to improvements in the growth and selection of the straw, and in the splitting, finishing, and bleaching. But when the conclusion of the war led to the importation of Leghorn hats, their fineness, colour, and durability speedily gave them a preference over the home manufacture, which thenceforth declined. With the view of improving the condition of the straw-plaiters, the Society of Arts offered premiums for the successful application of some of our native grasses, or straw other than the wheat-straw in general use; and for improvements in plaiting, finishing, and bleaching. The result of these offers was, that although the English straws, from the brittleness of their stems and the inequality of their colour, were not able to compete with the Leghorn, yet, by imitating and introducing among the English plaiters the Italian mode of plaiting and the Italian straw, it has been found practicable to found an intermediate system by applying English labour to Italian straw. The duty on the import of Leghorn hats was 5*s.* 8*d.* or 11*s.* 4*d.* each, according to the size; and of the Italian plait, 17*s.* per pound: whereas the straw paid but a mere nominal duty of one penny per cwt.; and thus the English plaiters were able to produce, from Leghorn straw, hats at a greatly lower price than the real Leghorn hat could possibly be sold for in England.

Of this branch of industry it has been observed:—"There is, perhaps, no manufacture more deserving of encouragement and sympathy than that of straw-plait, as it is quite independent of machinery, and is a domestic and healthful employment, affording subsistence to great numbers of the families of agricultural labourers, who without this resource would be reduced to parish relief. By the estimate of an intelligent individual, intimately acquainted with the manufacture, it is considered that every score (or twenty yards) of plait consumes a pound of straw in the state in which it is bought of the farmer; that, at an average, every plaiter makes fifteen yards per day; that in the counties of Hertford, Bedford, and Bucks there are, at an average, ten thousand scores brought to market every day, to make which thirteen thousand persons, women and children, must be employed. In Essex and Suffolk it is estimated that two thousand scores are the daily produce, to make which about three thousand persons are employed: and about four thousand persons more must be employed to convert these quantities into bonnets. Including other places where the

manufacture is carried on in England, there are, perhaps, in all about thirty thousand persons engaged in it.'

About twenty years ago a Scotch firm established straw-plaiting in the Orkney Isles, and adopted rye-straw as the material; and at first there seemed some prospect of success; but it does not appear that the competition of foreign-grown straw could be successfully met.

There are several descriptions of plait made in England—such as the 'whole Dunstable,' the 'split straw,' the 'patent Dunstable,' the 'Devonshire,' the 'Luton,' the 'Bedford Leghorn,' the 'Italian,' the 'backbone,' the 'lustre,' the 'wave,' the 'diamond,' &c.; differing from one another in the straws being whole or split, in the thickness of the straws, in the number of them plaited together, and in other points.

In Italy this manufacture is principally followed in the neighbourhood of Florence, Pisa, Sienna, and the Val d'Arno, in the duchy of Tuscany; and it is also established at Venice and other places. It is purely a domestic manufacture, as in England, and the produce is collected by dealers who go round the country. It has been estimated that about thirty thousand persons are engaged in the manufacture. The straw employed is cultivated solely for this purpose, and is a variety of bearded wheat somewhat similar to that grown in the Vale of Evesham. After undergoing a preparatory process, the upper parts of the stems (being first sorted as to colour and thickness) are formed into a plait of generally thirteen straws, which is afterwards knitted together at the edges into a circular shape called a 'flat' or 'hat.' The fineness of the flats is determined by the number of rows of plait which compose them (counting from the bottom of the crown to the edge of the brim); and their relative fineness ranges from about No. 20 to No. 60, being the number of rows contained in the breadth of the brim, which is generally eight inches. They are afterwards assorted into first second, and third qualities, which are determined by the colour and texture, the most faultless being denominated the first, and the most defective the third. These qualities are much influenced by the season of the year in which the straw is plaited; spring being the most favourable, both for plaiting and bleaching. The dust and perspiration in summer, and the benumbed fingers of the workwomen in winter, when they are compelled to keep within their smoky huts, plaiting the cold and wet straw, are equally injurious to the colour of the hats, which no bleaching can remedy. The flats are afterwards made up in cases of ten or twenty dozen, assorted in progressive numbers or qualities. The *Brozzi*-make bears the highest repute, and the *Signa* is considered secondary; which names are given to the flats from the districts where they are plaited. Florence is the principal market; and the demand is chiefly from England, France, Germany, and America.

Sagacity of Rats.—The sagacity and foresight of rats are very extraordinary, and the following anecdote, wonderful as it may appear, may be relied upon:—An open box, containing some bottles of Florence oil, was placed in a store-room which was seldom visited. On going into the room for one of the bottles, it was perceived that the pieces of bladder and the cotton which were at the mouth of each bottle had disappeared, and that a considerable quantity of the contents of the bottles had been consumed. This circumstance having excited surprise, some of the bottles were filled with oil, and the mouths of them secured as before. The next morning the coverings of the bottles had again been removed, and part of the oil was gone. On watching the room through a small window, some rats were seen to get into the box, insert their tails into the necks of the bottles, and then withdrawing them, lick off the oil which adhered to them. I would not give this anecdote were I not convinced of its accuracy. Whilst I am on the subject of the kind disposition which animals show to each other, I will mention an anecdote which was recently communicated to me of the old English or black rat. This animal has now become very scarce in this country. Unlike the Norway rat, which is fierce, and lives in little harmony even with its own species, our original animals appear to have been sociable in their habits, and to have shown kindness and friendship to each other. The fact referred to was communicated to me by the Rev. Mr. Ferryman, a clergyman in the county of Sussex, and an accurate observer of nature. He informed me that some fifty years ago, when the old English rat was numerous, he resided at Quorn in Leicestershire. Walking out in some meadows one evening, he observed a great number of rats in the act of migrating from one place to another, which it is known they are in the habit of doing occasionally. He stood perfectly still, and the whole assemblage passed close to him. His astonishment, however, was great when he saw amongst the number an old blind rat, which held a piece of stick by one end in its mouth, whilst another rat had hold of the other end of it, and thus conducted its blind companion. Mr. Ferryman also communicated to me the following anecdote of a rat, which I am in justice to him bound to admit he did not *implicitly* believe himself, neither are my readers required to do so; I merely give the story as I heard it. He said that he had an old friend, a clergyman, of retired and studious habits. This gentleman, when sitting in his room one day, saw an English rat come out of a hole at the bottom of the wainscot: he threw it a piece of bread, and in process of time he had so familiarised the animal that it became perfectly tame, ran about him, was his constant companion, and appeared much attached to him. He was in the habit of reading in bed at night, and was on one occasion awoke by feeling a sharp bite on his cheek: on looking round he discovered the curtains of his bed to be on fire. He made his escape, but his house was burnt down, and he saw no more of the rat. He was, however, convinced, and remained so for the rest of his life, that his old companion had saved him from being burnt to death by biting his cheek, and thus making him aware of his danger. The reader may put what faith he pleases on the supposition of the good clergyman. He himself was always indignant if any one doubted it; and certainly the marks of teeth were visible on his cheek. That rats are endowed with an extraordinary degree of ingenuity and cunning, there are numerous well-attested facts to prove: the following is one of them:—A ship on her voyage was not only much infested with rats, but proved so unfit for sea, that her stores were directed to be made over to another vessel. In doing this the greatest care was taken that the rats should not gain access to the other ship; and in order to prevent it, the two vessels were anchored at some distance from each other, and the stores were removed in boats. When the crew were about to quit the vessel, the whole body of rats were seen to make their way down its sides into the sea, and to swim to the ship into which the stores had been deposited: this they would have penetrated, had not the vigilance of the crew prevented them. The vessel got under weigh, and the rats were left to their fate.—*Jesse's Gleanings.*

Influence of the Fine Arts.—Wherever the arts are cultivated with success, they almost imperceptibly educate the general taste, and make politeness of mind keep pace with refinement of manners. They are to a highly commercial and opulent state of society what chivalry was to the feudal system; they wear down its asperities, correct its selfishness, relieve the sternness of its action, enliven the dullness of its repose, and mitigate the fierceness of its enjoyments. Where the arts are well understood, fashion cannot be so monstrous or fantastic as where they exert no salutary dominion over the fond love of variety. The source of excellence in art being a judicious observation of nature, and a right perception of her principles of beauty and symmetry, a closer adherence to nature will mark the fashions of society polished by their ascendency than can distinguish the habits of people without the sphere of their influence. Hence the barbaric nations, where there is much wealth, never expend it in such a way as proves they have any notion of the pleasures of refinement. They endeavour to attract admiration through the vulgar passion of adornment, which is in a moment excited, and as suddenly expires, rather than create a rational respect by consulting for the praise of enlightened opinion.—*Writings of the late Sidney Taylor.*



[Panama. - From an original Sketch.]

JUNCTION OF THE ATLANTIC AND PACIFIC OCEANS.

The extreme importance to all commercial countries of obtaining a ready access to the rich and productive countries of the East, has from the earliest dawn of European civilization led to efforts for its accomplishment. To the difficulties experienced in their Oriental trade by the Venetians and Genoese we owe the discovery of America by Columbus; but though a continent was found, the object sought was not attained. Since that time repeated and even yet continued endeavours have been made to discover a north-west passage, which for England would be the most advantageous, giving her a direct entrance by the North Pacific at once to her colonial possessions in North America, and her establishments in India, China, and Australasia. Of any such passage, practically useful for commercial purposes, there now seems but little probability. Failing in this point, modern enterprise has turned its attention to effecting by art what appears to have been denied by nature. The narrow strip of land, uniting what may be called the two continents, north and south, of America, extends from 77° W., the eastern end of the Gulf of Darien, to 83° W., St. Juan de Nicaragua, a length, measuring along the curve, of about five hundred miles, and lies between the parallels of 7° 20′ and 8° 45′ N. lat., with a breadth varying from thirty miles in Panama Proper, to about one hundred miles in the province of Veragua, which forms the western part of the neck. Any transit across this narrow strip, available for commercial purposes, would be of much benefit, and a navigable passage through it would enable European vessels to avoid the long and dangerous course round Cape Horn to all the countries bordering on the Pacific; and facilitate their route to China and the East Indies by availing themselves of the trade-winds, and escaping the doubling of the Cape of Good Hope; while to the United States which border on the Atlantic the advantage would be still greater. The passage sought for by Columbus would be in fact accomplished.

The first attempt of this nature dates as far back as 1695, when the Scottish parliament passed an act incorporating a company with extensive privileges, at the solicitation of one Paterson, to form a settlement on the Isthmus of Darien, into which scheme the Scottish nation entered with more than their usual enthusiasm. Paterson "considered that isthmus as a place where a good settlement might be made, or rather two settlements, for he proposed establishing a town and blockhouse on the side of the Atlantic, and another over against it in Panama Bay, on the shores of the Pacific, from which conjointly a trade might be opened both with the West Indies and the East." ('Pict. Hist. of England,' vol. iv., p. 54.) In 1698, 1200 men sailed from Leith Roads to form this settlement, and in October, says the work we have just quoted, "they landed at Acta, in a convenient harbour, one of the sides of which was formed by a long narrow neck of land. This neck of land they cut through, and, having thus formed a sort of island, they erected upon it their little fort, which they christened New St. Andrew's, or, according to other accounts, New Edinburgh. Some forty or fifty guns were landed from the ships and planted round the fort. On the opposite side of the commodious harbour there was a mountain commanding a very extensive view both seaward and landward, and here they erected a signal-house, and placed in it a corps of quick-sighted Highlanders to give notice of the approach of any hostile force. The first public act of the infant colony was a declaration of freedom of

trade and of religion to all nations. This great and ennobling idea, which as yet had not been acted upon by any of the English colonies in the New World, with the curious exception of that of Maryland, planted by the Catholic Lord Baltimore, seems to have originated with Paterson, who, whatever were his birth and education, possessed an enlightenment and liberality really extraordinary, and notions about commerce and conscience which had hitherto been confined to a few speculative and inoperative philosophers. Acta, or New St. Andrew's, was admirably situated on the northern coast of the Isthmus of Darien or Panama, about midway between Puerto Bello and Carthagena, being about fifty leagues distant from either town. The magnificent natural harbour was capable of receiving the greatest fleets, and was defended from storms by numerous islands and islets. On the other side of the isthmus, the little-frequented and unoccupied shores of the Pacific were indented with bays and harbours equally commodious: but the land communication from sea to sea lay over rough and lofty mountains, and through wild forests; the river Santa-Maria, which ran across a great part of the isthmus into the South Sea, was scarcely navigable by canoes, except at certain seasons of the year, and for short distances: there was almost every variety of natural difficulty to overcome; the whole line was fitted for ambuscades and hostile surprises, and if the Spaniards at any time chose to move from the town of Santa-Maria or Panama, there were passes and places where five hundred men might have arrested the march of five thousand." Supported by the power of England, the settlement might probably have succeeded, and ultimately have become important. But the English government, on the contrary, in reply to the remonstrances of Spain, declared that the expedition had been undertaken without their sanction, and forbade any assistance from or intercourse with our West India Islands. The Spaniards commenced a series of hostile attacks, and though the colonists made a gallant and protracted resistance, "bad food soon produced disease; the climate assisted in those ravages; the hardy mountaineers of Scotland perished by dozens a day; and, at last, when the sad residue, despairing of succour from their native country, took to their ships, there were scarcely a hundred men with health and strength enough to work them."

The colony was at length abandoned, though not till another detachment, consisting of thirteen hundred persons, had been dispatched; who, after experiencing numerous misfortunes, arrived only in time to find the abandoned fortresses, in which they ultimately surrendered themselves as prisoners to the Spaniards. Independently of the hostility naturally to be expected from the Spanish settlers, Paterson's error was in supposing that a transit trade could be profitably carried on over rugged roads, in a most unhealthy climate, in a country almost uninhabited, and by adventurers with a limited capital. He had concluded that cargoes of goods landed at Acta, or New St. Andrew's, could easily be transported by land and river carriage from sea to sea, and then re-shipped in the Gulf of Panama for all the great countries of the East. But the streams were found in this part to be shallow and unnavigable; labour, except European, not to be procured; and no roads adapted for any burdens, except by mules. A village named Puerto Escoces, on the Atlantic side, seems the only existing monument of this melancholy undertaking.

The more modern idea has been that of constructing a navigable canal, either by cutting throughout the narrowest part, or, taking a longer course, by making the streams and lakes subservient to the purpose. To both these plans there are almost insuperable difficulties, as will be evident from a consideration of the nature of the country. Though the comparatively small width of the isthmus was soon discovered, and the means which it offered to a speedy and easy communication between the Atlantic and the Pacific were apparent, yet for three hundred years after this discovery the natural features of this region were entirely unknown. Robertson, in his 'History of America,' states that the isthmus is traversed in all its length by a range of high mountains; and it is only of late years that Mr. Lloyd, an Englishman, employed in 1827, by Bolivar, then President of Columbia, has surveyed the most eastern and narrowest part of it.

The place where the Andes of South America terminate has not been quite ascertained. On our maps a mountain is laid down, near 8° N. lat., which is called the Peak of Candelaria, but it is not known whether it is connected with the Andes or is an isolated summit. There are some reasons for supposing that it is not connected with that mountain-range. But it is certain that west of this mountain (77° 30′ W. long.) no range of hills or mountains, not even an isolated elevation of moderate height, occurs, and that the whole isthmus between the two seas is a flat country, only a few feet above high-water mark. This low country extends westward for more than a hundred miles to the western extremity of Mandingo Bay. The average width of this part of the isthmus does not exceed forty miles, and opposite Mandingo Bay, called also the Gulf of San Blas, it contracts to less than thirty miles. The shores on both oceans are rocky, and the whole region appears to consist of an immense mass of rock. The rocks, however, are covered by a thick layer of vegetable mould, and are covered with high forest-trees. The shores of the Caribbean Sea are difficult of access for large vessels, being lined with numerous small rocky islands called *keys*. Two rivers drain the isthmus. They are called respectively Chucunaque and Chepo, and rise near 78° 30′ W. long. The Chucunaque runs east-south-east about eighty miles, and, turning west by an abrupt bend, falls into the Bay of San Miguel; the Chepo or Ballano runs west-north-west, and empties itself into the Gulf of Panama, about twenty-four miles east of the town, making a similar turn to the south. Both rivers are navigable for large river-barges as far as the places where the great bend occurs. With all the advantages which this region possesses from its great fertility and the vicinity of two great oceans and navigable rivers, it is thinly inhabited, and chiefly by a tribe of Indians, the Mandingoes, or San Blas Indians, who are at constant enmity with the white settlers, though they receive in a friendly manner the vessels which annually visit the country from Jamaica. The whites have only a few settlements on the Chepo river, and even these are chiefly occupied by negroes. The small town of Chepo, above the bend of the river of that name, is the most considerable settlement of the whites, but the inhabitants have little communication with their neighbours the Mandingoes. The scantiness of the population of this region is mainly, if not entirely, to be attributed to the unhealthiness of the climate. Being open on all sides to a vast expanse of ocean, every wind brings rain, and thus hardly a day passes in which the country is not drenched by heavy showers, which sometimes last for several days together. The surface of the country, not having sufficient slope to carry off such an abundance of moisture, is converted into an immense swamp. This moisture of the air, indeed, maintains a most luxuriant vegetation, but the great quantity of vegetable matter, which is annually reproduced and decomposed, increases the miasma which exhales from a swampy soil under the influence of a vertical sun.

At the western extremity of Mandingo Bay some

hills commence, which gradually attain the elevation of mountains, and extend in a continuous chain as far west as a line drawn across the isthmus from Port Limones to the town of Panama, a distance of about sixty miles. These hills advance close to the shores of the Caribbean Sea, where they surround the town of Puerto Bello, but they remain a few miles distant from the Pacific, and are separated from it by a level prairie destitute of trees. These hills occupy nearly the whole width of the isthmus, but they are divided longitudinally into two ridges, between which lies the valley of the river Chagres. The southern ridge does not exceed one thousand or eleven hundred feet in height, but the northern rises much higher, especially east of Puerto Bello. These hills are generally covered with thick and almost impenetrable forests. The valley of the river Chagres is rather narrow, but the river itself is navigable to a considerable extent. The climate in this portion of the isthmus differs considerably in the north and in the south. At Puerto Bello, on the northern coast, the rains are almost continual, and generally descend in torrents, a circumstance which renders that place very unhealthy. At Panama, on the shores of the Pacific, the seasons are regular. In April the weather becomes cloudy about noon, but after drizzling for half an hour it clears up. In May, from nine to eleven o'clock, it is dull, with slight rains, but the afternoon is fine. In June there is rain every morning and evening, but the middle of the day is fair. As the season advances the rains gradually increase, and are incessant during July, August, September, and October. In November the nights are always rainy and cloudy, but during the days the sky begins to break. In December the weather improves, and in January, February, and March a shower of rain is as uncommon as a beam of sunshine in the other season of the year. The valley of the Chagres seems to partake rather of the climate of Panama than of that of Puerto Bello At Panama the thermometer, in the rainy season, is 82° during the night, and 87° during the day; but the winds being at that season variable and cool, there is no stagnation in the atmosphere, though the rain is incessant. In the dry season the temperature rises to 90° and even 93° in the daytime, and the days are very sultry, inasmuch as calms prevail at that season; but the land-winds at night are cool, coming chiefly from the adjacent mountains; and the climate may be called generally healthy, though a considerable mortality sometimes occurs.

[To be continued.]

THE MECHANICAL ARTS IN PERSIA.

About two or three years ago, Mr. J. Robertson, a civil and mining engineer, who had been professionally engaged in the service of the Shah of Persia, communicated to the Royal Scottish Society of Arts an 'Account of the Mechanical Arts of Persia.' Of these communications an abstract was afterwards given in the 'Edinburgh Philosophical Journal;' and as the details are of a nature which are not commonly treated of in books of travels, we will here give a short notice, illustrated occasionally by references to the works of Fraser and Morier.

The art of carpentry, as understood in this country, can hardly be said to exist in Persia, the greatest effort in this department being confined to the construction of flat roofs of limited span. For forming these roofs a species of poplar is generally employed; but for other purposes oak, plane, and chestnut are used. Hard timber, of small scantling, is sold in bazaars, being brought thither from the forests on the backs of mules or camels. Morier states that in Persia "the people cut their trees about five feet from the ground, burning them a little, and then applying the hatchet;" and in another part he remarks that "their mode of felling the tree is susceptible of much improvement; for they first burn it towards the root (by which they injure the finest part of the wood) and then apply the axe."

As to the mode in which the Persian carpenter pursues his work, it is remarked that he follows the Eastern custom of sitting on the ground. Instead of a bench, a strong stake is driven down before him, leaving about ten inches above the ground; and upon this he rests his work, which he keeps steady with his feet. In the Royal Arsenal, however, English tools are used, and a better system of working has been introduced, under the superintendence of British officers; but in the native workshops the workmen are still to be seen squatting on the ground; and as all the tools are adapted for this mode of working, there seems but little reason to look for change, especially among a people who adopt new customs slowly.

Turning in wood is performed by a workman also seated on the ground: two stakes are driven down before him, a short distance apart; and an iron spindle, with a small drum attached, revolves between them. The spindle is passed through the wood which is to be turned, and, with the assistance of a bow-and-string, passed round the drum, is made to revolve rapidly. The bow is worked backwards and forwards, while the right hand holds the cutting-tool supported on a block of wood. By combinations of these two modes of working carpentry and turning, a large variety of domestic utensils are made in wood. Thus Mr. Fraser, in his journey to the northern provinces, came to a village where almost everything was made of wood: "The gates, portals and all, were constructed of wood, and a wooden bridge was thrown across the ditch: the very domestic implements, instead of being formed of earthenware or metal, were here made of wood. We saw trays, platters, cups, and bowls of this material."

In smith's work the Persians work only on a small scale, and with light and simple tools. The iron generally used is of Russian manufacture, brought by mules from the ports of the Caspian Sea. In the northern parts of Persia malleable iron is manufactured directly from the ore; and this description of iron has been long esteemed for making excellent horseshoes and horseshoe nails. As coal is almost unknown in Persia, the fuel used by the smiths is entirely charcoal prepared from hard wood. The smith stands when the work requires to be heated; but in finishing or making small articles he sits on the ground. The hearth is a small platform without a chimney, having a low wall on one side to prevent the bellows being injured by the heat. Anvil, bellows, hammer, tongs, and drill, form the smith's apparatus.

Working in stone is not much practised in Persia, owing to the buildings being formed chiefly of clay or brick. Grave-stones, mill-stones, and a few other articles, constitute the chief field for this operation. When the work admits of it, the stone-cutter sits upon the ground. The principal tools are, small double-pointed picks and mason-irons resembling large nails, some pointed and some chisel-shaped. With these tools the stone-cutters work very slowly, and it is only after immense labour that they succeed in bringing a hard stone to the required form. For boring in stone the instrument is an iron rod steeled at the end, but instead of a chisel-point, the end is cut off flat. Two parallel regular grooves are cut deep across this face, and these are intersected by three others at right angles, thus dividing the end of the rod into twelve compartments. While boring, the hole is kept full of water; and while the rod is turned round gradually with the left hand, the blows are struck by a small hammer held in the right.

In connection with stone-cutting may be mentioned the finer kind of work which comes within the sphere of the lapidary. The turquoise stones, found at Nishapore, are brought into shape, chiefly at the town of Mushed, by being ground on the edges of wheels, the wheel being rotated by a bow-and-string, and the rim having the requisite degree of roughness given to it by a layer of sand and gum-lac. Mr. Fraser, after describing this process, says:—"Besides the turquoise-cutters, there are a good many people in Mushed who gain a livelihood by cutting a dark grey stone, of a soft texture, into utensils for domestic purposes, as cups, dishes and platters, tea and coffee pots, water-ewers, and the like; all of which are much esteemed, and find their way to distant quarters of the country, though it is not easy to discover in what their peculiar excellence consists."

As the Persian houses are mostly built of brick, the art of brick-making is rendered one of some importance. A level space of ground having been selected near a stream of water, the grass and vegetable soils are carefully removed. The ground is then broken at one extremity of the prepared platform, and the easily pulverized clay is carefully passed through a small-meshed riddle, and placed in the hollow, while the stones and roots are thrown behind. When a sufficient quantity of riddled clay has been collected, a small stream of water is allowed to flow into the hollow, and the mass is brought to a proper consistency by treading. The prepared clay is now deposited in different small heaps upon the floor, which has been previously spread with finely-riddled earth. The moulds are formed of thin wood, without any of those projections or handles which are seen in this country. For the common-sized brick the mould is formed about nine inches square and one inch and a half deep; but larger bricks are sometimes required for paving courts and coping walls, for which another mould is necessary. The mould is placed on the ground, and the brick-maker, taking a part of the clay in his hands, places it loosely in the mould. He then dips his hands in water and throws a little of it around the inside of the mould to prevent the clay from adhering to the wood. By a peculiar action of the hands the clay is then drawn from the middle and pressed firmly into the corners and round the sides of the mould; and the whole is afterwards levelled over by a dexterous diagonal stroke of the right hand. The mould is now lifted off the brick and placed to the right hand side, close to, and in the same line with, the brick already formed; and it is again filled up in the same way. Thus he proceeds, frequently washing the mould in water, till a straight line of bricks has been laid down, of many yards in length; a second line is then commenced, exactly the thickness of the mould, from the first; and the whole ground is finally covered with closely-arranged rows of bricks. In two or three days, when the level space has been covered, the first-made bricks become sufficiently dried to be handled; and the brickmaker now proceeds to place them upon edge in lines; in a day or two they are sufficiently hard to be removed, and are then carried to a convenient spot, where they are built up edgewise in form of a wall, one brick in thickness, with small openings between them for the circulation of air. When twenty or thirty thousand have been thus collected, they are removed to a kiln to be burned; or if sun-dried bricks be required, they are at once ready for use.

As there is hardly any coal in Persia, the kilns are heated in a singular manner. The kiln is a small vault, dug out of the ground, and surrounded by a wall of sun-dried bricks, having a doorway at each end for receiving the fuel. Over the vault are several narrow arches, in which the bricks are laid edgewise: and after a fuel of stable refuse, withered plants, and brush-wood has been laid in the vault and kindled, the doorways are closed. In two or three hours dense white smoke rises and escapes at two openings left in the arching, and new fuel is from time to time introduced; but when enough has been thus thrown in, all the openings are closed, and the kiln left for two or three days, till cold, at which time the bricks are found to be sufficiently burned. The bricks thus made have a fine red colour and considerable hardness. It is said that a Persian will prepare the clay and make two thousand of these bricks in a day.

The houses are built either of bricks or of clay; if the former, a mortar of clay, chopped straw, and lime is employed. While building, the workmen do not use a trowel, but lay the mortar with the hand. The 'bond,' or mode of arrangement, is simple, as the bricks are square, and do not admit of a very varied arrangement. The mortar-joints are usually from one to two inches thick, and very irregular, unless in arches or doorways, when a good deal of neatness is often exhibited. As timber is scarce, brick arches and domes are common. The mode of making a semi-cylindrical arched roof, without centering, is very singular. After the side walls and gables have been erected, the curve of the arch is marked out upon one of the gables, and this is plastered over with the common clay mortar; a layer of brick is then stuck upon the mortar, and as the bricks are thin and light, they remain firm till the ring is completed, when small chips are pinned into the joints at the opening ends. When one layer is finished, it is plastered over with mortar, and a second layer is stuck upon it in the same manner, and so on until the whole length of arch is finished. A similarly primitive mode is adopted in the building of domes.

Many of the walls of houses are built hollow, that is, the bricks being so large in surface compared with the thickness, they are so placed, some horizontal and some vertical, as to give smooth outer and inner surfaces to a wall, and yet be full of hollow spaces, whereby material is saved under circumstances where strength is not required. In building the flat roof for dwellings, beams of poplar are laid across, which support small laths. A coarse mat, made of reeds, is placed on the laths; over this a layer of furze; and over the furze a thick layer of clay. The top of the clay is made to slope gently, and is rendered impervious to water by being coated repeatedly with clay and chopped straw.

For houses built of clay the material is generally procured near the intended erection, and is brought to the proper consistency by mixing with water and treading with the foot. For walls a foundation is cut out as far down as the vegetable mould, and this trench is filled up with small stones and clay. The walls are built in courses of about one yard in thickness, each course being allowed sufficient time to consolidate before another is laid. The workman stands upon the top of the wall, and being supplied with pieces of clay by an assistant below, he elevates his arms and throws the mass forcibly down, treading the pieces firmly together with his feet. The layers are brought to the required 'batter,' and smoothed on the outside, by means of a flat cutting spade. The heat and extreme dryness of the climate soon render a wall of this description hard and firm: they last a very long time, as rain seldom falls. Most Persian villages are surrounded by high walls of this kind, having flanking towers at every angle and a rude ditch in front, from which the materials were excavated; and even the fortifications of the principal cities are constructed of the same material.



[Nest of the Common Humble Bee (Bombus terrestris).—a, Male; b, Large Female; c, Worker.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

THE HUMBLE-BEE.

The development of instinct, as manifested by the operations and in the economy of animated beings, affords much matter for reflection and observation. By instinct we mean that innate power or principle impelling to the performance of works necessary either to the well-being of the individual or the species, and which rules, irrespective of experience, in the mode adopted, in the materials selected, in the site, and arrangement which directs in the observation of time, in attention to size, figure and numbers, and which bears alike upon the present and a future day, leading to results which appear to be those of reason, reflection, and forethought, involving also a knowledge of the past. No living animal, not even man, is destitute of instinct: we see its manifestations in the infant, but as reason dawns it becomes weaker and weaker; and, indeed, in such of the lower animals as are susceptible of education we find it shaken by what we may well term artificial education, which, as in the dog, calls forth limited and imperfect trains of reasoning, simple deductions of effects from causes, the result of experience and discipline; and, more than this, we see the civilization thus effected, and kept up, influence the character and propensities of a whole race—we see it affect their physical structure.

The results of pure instinct are in no animals so wonderful, so interesting, as in insects. Birds, indeed, cannot but attract our notice: who can examine their nests, so various in form and materials, so artfully constructed, without feelings of pleasure? Look at the nest of the Tailor-bird, a soft couch in a leafy cradle suspended at the end of a slender twig; look at the hanging nests of the Pensile Weaver-bird (and how many could we not enumerate?), and acknowledge, reader, with me, that they are admirable examples of the operations of instinct.

Still, however, as we have said, even more wonderful exemplifications of the governing principle of instinct are to be found in the works of insects. The waxen architecture of the hive-bee (Apis mellifica), its habits and economy, have been the admiration of intelligent minds in all ages, and the greatest philosophers have applied themselves to the elucidation of its history, and of the principles on which it proceeds to build its hexagonal cells with such accurate precision.

It is not, however, to the hive-bee that we are about to invite attention, but to a relative of less pretensions, whose works are comparatively simple, yet far from being without interest. We allude to the common Humble-bee, which all the summer long we see wandering over clover-fields, and through gardens, busy with every flower, and assiduously trying nectary after nectary with its proboscis. If one of these bees be watched with a little patience and some tact, it may be traced to its retreat, where it has laboured in constructing cells and laying up a store of honey. The domicile of the humble-bee is a simple excavation in some bank, a little chamber of about six or eight inches in diameter, to which leads a long winding passage, capable of admitting of the ingress and egress respectively of two bees at the same time. Some species, as the Bombus muscorum, select a shallow excavation which they dome over with a felt of moss or withered grass, lined with a coat of wax to render it waterproof; but the Bombus terrestris makes or enlarges a subterranean vault, a foot beneath the surface of the ground, and in this is the colony established. The population, however, is not numerous, seldom exceeding one or two hundred, and may be divided into *females*, *males*,

and *workers*. The females are of two sorts, *very large* and *small*. The large females, or queens, look like giants compared to the smaller females and workers; they produce males, females, and workers, but the small females produce only male eggs. The large females, then, we may regard as the founders of every colony; and by following up the details we shall be able to render the plan clearly intelligible.

These large females, in an established colony, emerge from their pupa state in the autumn, and pair in that season with males, the produce of the small females which have previously acquired their due development. Now on the approach of winter these large females, the pairing time over, retire each to a little snug apartment, lined with moss or grass, and separate from the general vault, passing the cold season in a state of torpidity. Early in the spring they awake, issue forth, and take different directions, seeking for some convenient spot in which to begin their labours. At this time of the year large females may be often observed exploring every cavity, hole, or crevice, in banks or on the ground; they are seeking a fit site for their operations. We will now suppose one of these queens to have formed and established herself in her chamber; she begins to collect honey and pollen, and constructs cells in which her eggs are to be deposited. So rapidly are the latter built, that to make a cell, fill it with honey and pollen (the food of the young), commit one or two eggs to it, and cover them in, requires little more than half an hour. Her first and most numerous brood consists only of workers, which, as soon as excluded from the pupa, assist their parent in all her labours. Her next brood consists of large and small females and males; these appear in August or September; but, if Huber be correct ('Lin. Trans.,' vi., 285), the male eggs, or some of them at least, are laid in the spring with those that have to produce workers. We have now, then, small and large females, males, and workers, the produce of the original queen who singly began to found this establishment. It will be interesting to look a little closer into their transactions; and, first, those of the workers. These are by far the most numerous tenants of the colony, and to them is entrusted the reparation of any part by the deposition of wax, and the spreading of it in patches over the roof. When in any of the cells one of the larvæ has spun its cocoon and assumed the pupa state, it is their department to remove all the wax away from it; and after the pupa has attained its perfect state, which takes places in about five days, to cut open the cocoon, in order that the perfect insect may emerge from its imprisonment: it is theirs, moreover, to supply the young grubs with food after they have consumed the stock deposited with each egg in the cell, and regularly feed them either with honey or pollen, introduced in their proboscis through a small hole in the cover of each cell, opened as occasion may require, and carefully covered up again. As the grubs increase in size, the cells which contained them respectively become too small, and by their struggles the thin sides split; the breaches thus produced they repair with wax as fast as they occur, attentive to see where their services are required: and it is in this manner that the cells gradually acquire an increase of size to accommodate the increasing larvæ. Besides these duties, in chilly weather and at night the workers brood over the pupæ shrouded in their cocoons, in order to impart the necessary warmth and maintain a due degree of temperature. They relieve the mother-queen, in fact, of half her cares and nearly all her labour. In some nests there are from forty to sixty honey-pots, the cocoons of the bees recently emerged from their pupa condition, and more than half of these are often filled in a single day. It must not be supposed that the interior of the nest presents the same appearance as that of the hive-bee. Instead of numerous vertical combs of wax, we see either a single cluster of cells or a few irregular horizontal combs placed one above another, and supported by pillars of wax. Each layer consists of several groups of yellowish oval bodies of three different sizes, those in the middle being the largest, the whole slightly joined together by a cement of wax. These oval bodies are the silken cocoons spun by the young larvæ: some are closed at the upper extremity, some are open; the former are those which yet include their immature tenants; the latter are the empty cases from which the young bees have escaped. Besides these are the cells of wax, in which are eggs and a store of pollen and honey, but from which in due time the workers will remove the wax, the larvæ having completed their silken shroud. These larvæ, their food being exhausted, are, as we have said, regularly supplied by the workers. There are, moreover, the honey-pots, that is, the relinquished cocoons patched up and strengthened with wax and filled with nectar, and sometimes vessels of pure wax containing the same luscious store.

The workers have indeed plenty of business on their hands, and are busy all the summer long. But the winter comes, and they all perish; they have fulfilled their allotted part, and their services are no more needed. From the workers let us pass to the mother-queen, and inquire into her duties and actions. We have said that the workers are her first progeny, and we must suppose her surrounded by them. They are watching all her movements, for she is about to deposit in the cells the eggs from which the second brood is to spring; and, by a strange instinct, they endeavour to seize the eggs as soon as laid, and devour them. It is not easy to understand the object to be accomplished by this procedure on the part of the workers, unless it be to keep the population within due bounds. Be this as it may, the female has to exert herself to the utmost to prevent her eggs from being all devoured; and it is only after she has driven them back several times and utterly routed their forces, that she succeeds in accomplishing her purpose. When she has deposited her eggs in the cells (each supplied with a store of pollen moistened with honey) and closed them up with wax, she has still to keep vigilant watch over them for six or eight hours, otherwise the workers would immediately open the cells and devour their contents. After this period, strange to say, the nature of the workers seems changed; they no longer evince any appetite for devouring the eggs or destroying the cells; the female gives up her charge, committing all to their care, and they faithfully and assiduously perform the duties we have previously detailed. From these eggs proceed a few large females, to be at a future day the founders of colonies; a few males, and small females, closely resembling the workers, but attended by the males, which form their court. And now, as Huber assures us, the whole establishment is a scene of confusion; for these small females begin to prepare cells for their eggs, and this proceeding rouses the anger and jealousy of the queen-mother to the highest pitch. She assaults them with fury, driving them away; puts her head into the cells and devours their eggs, and is in turn herself assaulted and forced to retreat. They then contend among themselves for various cells, several females often endeavouring to lay their eggs at the same time in the same cell, but after a short period tranquillity seems restored. These small females all perish on the commencement of winter. Their produce consists only of males, which pair with the large females in the autumn, the latter retiring to their hybernaculum and sleeping till spring. The males are rather larger than the small females

whence they sprung, and their antennæ are longer and more slender. They are not an idle race, for Reaumur asserts that they work in concert with the rest to repair any damage that may befal their common habitation. They act in some sort as scavengers of the settlement, removing every sort of rubbish and the dead bodies of such individuals as may chance to die, but they do not forage for building materials and provisions, nor do they take any share in rearing and attending to the young.

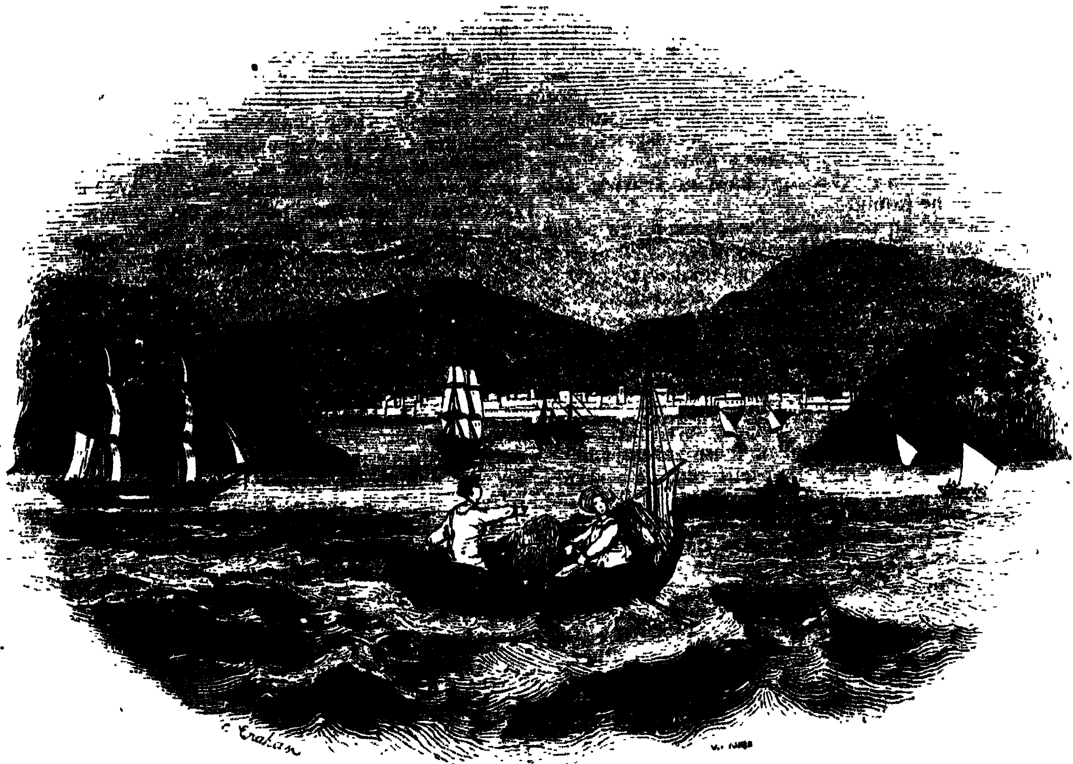
Such then is an outline of the proceedings which occur in every colony of Humble-bees, all of which, with the exception of a few large females destined to continue the race, perish at the close of autumn.

It is the opinion of Huber that the workers of the humble-bee are really females in an imperfect condition and incapable of reproduction, and that the development of the large and small females is dependent upon the nature of the food with which they are supplied during their larva condition. Kirby says, "As in the case of the Hive-bee, the food of these several individuals differs, for the grubs that will turn to workers are fed with pollen and honey mixed, while those that are destined to be males and females are fed with pure honey." It is, however, still a question to what specific cause we are to attribute, the difference between the large and the small females, which are as distinct in appearance as in habits and operations. Humble-bees may be more easily studied than either hive-bees or wasps; the two latter, and especially the wasps, being very irritable, and displaying great resentment against any intruder; while the humble-bee is indifferent to the presence of a spectator, and while collecting honey will permit itself to be touched or stroked without attempting to use its sting.

Mr. Huber relates a very amusing anecdote respecting some hive-bees paying a visit to a nest of humble-bees placed under a box not far from the hive of the former, in order to beg or steal their honey. The narration places in a strong light the good temper and generosity of the latter. The circumstance happened in a time of scarcity. "The hive-bees, after pillaging, had almost taken entire possession of the nest; some humble-bees which remained, in spite of this disaster, went out to collect provisions, and bringing home the surplus after they had supplied their own immediate wants, the hive-bees followed them and did not quit them till they had obtained the fruit of their labours. They licked them, presented to them their proboscis, surrounded them, and at last persuaded them to part with the contents of their honey-bags. The humble-bees flew away after this to collect a fresh supply. The hive-bees did them no harm, and never once showed their stings, so that it seems to have been persuasion rather than force that produced this singular instance of self-denial. This remarkable manœuvre was practised for more than three weeks, when the wasps being attracted by the same cause, the humble-bees entirely forsook the nest." The care and attention displayed by the workers towards the larvæ or young is proved by an interesting experiment conducted by M. P. Huber, and which is recorded in the 'Linnean Transactions,' vol. vi., p. 247. This observer put under a bell-glass about a dozen humble-bees, without any store of wax, along with a comb of about ten silken cocoons, so unequal in height that it was impossible the mass should stand firmly. Its unsteadiness disquieted the humble-bees extremely. Their affection for the young led them to mount upon the cocoons for the sake of imparting warmth to the inclosed little ones, but in attempting this the comb tottered so violently, that the scheme was almost impracticable. To remedy this inconvenience and to make the comb steady, they had recourse to a most ingenious expedient. Two or three bees got upon the comb, stretched themselves over its edge, and, with their heads downwards, fixed their fore-feet on the table upon which it stood, whilst with their hind-feet they kept it from falling. In this constrained and painful posture, fresh bees relieving their comrades when weary, did these affectionate little insects support the comb for nearly three days. At the end of this period they had prepared a sufficiency of wax with which they built pillars that kept it in a firm position, but by some accident afterwards these got displaced, when they had again recourse to their former manœuvre for supplying their place, and this operation they perseveringly continued, till Mr. Huber, pitying their hard case, relieved them by fixing the object of their attention firmly on the table.

Must we from these facts infer that the bees in question were guided in their operations by a process of reasoning? If so, we must admit that all the extraordinary manœuvres and labours of bees, wasps, and ants, are under the governance of the same principle; for all exhibit an appearance of forethought, and pursue the best means to produce a given result. "If," says Mr. Kirby, "in this instance these little animals were not guided by a process of reasoning, what is the distinction between reason and instinct? How could the most profound architect have better adapted the means to the end? how more dexterously *shored* up a tottering edifice, until his beams and props were in readiness?" The architect could not, perhaps, have acted better: but he would have been influenced by experience, and reasoned upon the affair. In the case of the bees they were impelled to a given labour (and perhaps in that particular instance a very useless one) by an instinctive impulse, similar to that which urges the beaver to construct his dam, and the same instinct also directed them in the mode of its accomplishment. Surely the leaf-rolling caterpillar displays quite as much apparent reason in the means it employs to shroud itself in its dormitory, or the ant-lion when he makes his pitfall. Man in his operations is guided by experience and reason; and having no natural instruments, he fabricates them, and becomes a builder, a spinner, a miner, a worker in wood and metal; he varies his plans and operations as experience may dictate, as reason may suggest; he alters, he improves. Not so the instinct-guided insect or bird: it never deviates beyond a certain point from the plan which its species time immemorial has followed; the bird that builds a pendent nest never forms one in a hollow tree: the bee never attempts to become a paper-maker, like the wasp; and here be it remembered that to whatever operations instinct urges, the animal is by nature furnished with the proper implements for accomplishing them, and that it never impels to works which the animal has not the natural means of performing or carrying on.

Youth and Age.—People place youth and age opposite to each other, as the light and shade in the day of life. But has not every day, every age, its own youth—its own new attractive life, if one only sets about rightly to enjoy them? Yes, the aged man who has collected together pure recollections for his evening companions is manifold happier than the youth who, with a restless heart, stands at the beginning of his journey. No passions disturb the evening meal of the other, no restless endeavours disturb the cheerful gossip of the evening twilight: all the comforts of life are then so thoroughly enjoyed; and we can then with more confidence cast all our cares and anxieties on God. We have then proved him.—*Mary Howitt.*



[Puerto Bello.—From an original Sketch.

JUNCTION OF THE ATLANTIC AND PACIFIC OCEANS.

[Continued from page 399.]

West of a line drawn from the vicinity of Panama to the Bay of Limones begins the third region of the isthmus, which extends westward on the Caribbean Sea to the rocky island called Escudo de Veragua, and on the Pacific to the innermost corner of the Gulf of Parita, a distance of about eighty miles. This country exhibits different natural features. It is, properly speaking, a plain which rises from both oceans with a very gentle ascent towards the middle of the isthmus. Numerous isolated hills, however, rising from three hundred to five hundred feet above their base, are dispersed over the surface of this plain. These hills occur much more frequently towards the extremities of the region near the mountains of Puerto Bello and the table-land of Veragua; in the middle of the region are plains of considerable extent, especially between the towns of Chagres and Chorrera; on these plains some isolated ridges of hills of inconsiderable height occur. The hills are generally covered with trees, but the plains and low grounds which surround them are savannahs or prairies, destitute of trees, but covered with grass, which supplies pasture to numerous herds of cattle and horses. Though the vegetation of this region is generally much less vigorous than in the country farther east, there are several cultivated tracts, and others which may be cultivated. The climate also is much more healthy, especially on the slope towards the Pacific, which in climate and season exactly resembles the country surrounding the town of Panama. The country along the shores of the Caribbean Sea is far less healthy, and the season much more irregular. Accordingly we find that the southern districts are comparatively thickly settled, while the northern are nearly uninhabited. The principal rivers of this region are the Trinidad and the Caymito or Chorrera. The Trinidad enters the Chagres about twenty-four miles from its mouth, after a course of about sixty miles. It rises near the south coast, not far from the town of Chorrera, and is navigable for a considerable distance. Traversing the isthmus in a diagonal line from south-west to north-east, the agricultural produce of the more inhabited districts is conveyed by this river to Chagres. The Caymito or Chorrera is formed by several petty streams which descend from the eastern declivity of the table-land of Veragua, and though its course is short, it is navigable to the town of Chorrera. There is a harbour at its mouth, but the anchorage is bad and exposed.

West of this region is the table-land (mesa) of Veragua. Its eastern ascent is formed by projecting mountains of great elevation, rising abruptly, and frequently exhibiting an almost perpendicular face of bare rock. The surface of the table-land itself is very uneven, and several summits on it rise to a great height. The Peak de Veragua is stated to attain nearly nine thousand feet above the sea-level. In some places, however, there are plains of considerable extent. The general elevation of this table-land above the sea-level is supposed to be between three and four thousand feet. It approaches the Caribbean Sea within a few miles, and is separated from it by a narrow and slightly hilly tract. But on the side of the Pacific the mountains approach close to the sea, and between the Gulf of Parita and the Bay of Montijo project in a wide and mountainous peninsula into the Pacific. This peninsula terminates in the capes called Punta Mala and Punta Mariata. We are very little acquainted with the climate and soil of this region, but as it undoubtedly is much more populous than the lower part of the isthmus, it must be presumed that it is favourable to agriculture and to the health of the inhabitants. This last circumstance is due to the

great elevation of the surface above the sea-level. The rivers which descend from this table-land are interrupted by rapids and cataracts, and bring down great quantities of earthy matter, which they deposit at their mouths. All these rivers accordingly have a bar, with a very few feet of water on it, which renders them incapable of receiving vessels of above one hundred tons burthen.

The most western portion of the Isthmus of Panama begins at the western declivity of the table-land of Veragua, and extends to the boundary-line of Central America. This line begins on the shores of the Caribbean Sea at Chica or Monkey Point, and terminates on the Pacific at Punta Boruca. This region is rather more than one hundred miles from east to west, and about seventy miles from north to south. The northern part is occupied by the Chiriqui Lagoon, a sheet of water ninety or one hundred miles in length from east to west, and on an average twenty miles wide. It is separated from the Caribbean Sea by a series of low, swampy, and wooded islands, between which there are three deep passages for vessels. The most commodious of these passages is the most eastern, near a tongue of land projecting from the continent. It is called Chiriqui Mouth, and may be navigated by the largest vessels. Farther west is the entrance, called Boca del Toro (Bull's Mouth), which is only eighteen feet deep, and narrow, but of easy access. The most western, called Boca del Dragon (Dragon's Mouth), is also narrow, but very deep. The middle portion of the lagoon is occupied by low woody islands, but at each extremity a considerable space is free from islands, and affords excellent anchorage, as the lagoon is deep, and the swell of the Caribbean Sea is broken by the intervening islands. The country contiguous to the southern shores of the lagoon, for a distance of about twenty miles, is low and swampy, the soil being covered with a thick layer of alluvium produced by the annual inundations during the rainy season. At the back of this low tract, which is generally wooded, the country rises, and though it contains plains of some extent, it continues to rise gradually for forty or fifty miles from the lagoon, where it is bordered by a continuous ridge of high ground. This chain, which is called the Cabecares Mountains, may be between four and five thousand feet above the sea-level, but it is of very inconsiderable width, being only about five hundred yards across in its upper part, which extends in nearly a straight line without any peaked summits. The southern slope of this ridge is much more rapid, occupying only about ten miles in width, and terminating on the Pacific in tolerably level tracts, which, however, are many feet above the level of the sea. The whole country north of the Cabecares Mountains is one continuous forest of lofty trees, but along the Pacific there are several woodless tracts. It is only in the last-mentioned district that the whites have formed a few establishments, the extensive country north of the Cabecares Mountains being in possession of the native tribes, especially the Valientes. This may be attributed to the climate, which, on the coast of the Pacific, resembles that of Panama, being subject to regular changes of the seasons, and therefore healthy. But the low country about the Lagoon of Chiriqui is drenched with rain nearly all the year round: the more elevated tract, however, between it and the Cabecares Mountains has more regular weather, and is considered tolerably healthy. The numerous rivers which run from the northern slope of the mountains into the Chiriqui Lagoon are impeded by many rapids and cataracts until they reach the low country, where their course is gentle, and where they may be navigated by large boats; but they have bars across their mouths, with little water on them.

The coast along the Caribbean Sea, from the Bay of Candelaria, into which the river Atrato falls, to the Bay of Mandingo, does not present a single harbour for large vessels. It is lined by a continuous series of small keys, or rocky islands, lying from half a mile to a mile from the continent. The inner passage thus formed is full of coral rocks and reefs, but the water is so clear that they are easily seen and avoided in the day-time. Otherwise a vessel finds safe anchorage there, except during the prevalence of the north-western winds (from December to April), as the swell of the sea is broken by the islands. The first harbour which occurs on this coast is that of Puerto Bello, or Velo, which is about two miles long, and, on an average, one thousand yards wide. It is of considerable depth, and, being surrounded by high hills and mountains, affords excellent and safe anchorage for vessels. Though it once was a place of great trade, it is now rarely visited, on account of its excessive unhealthiness. The town, which is built on the southern shores of the harbour, consists of one long street, with a few short streets branching off where the ground will admit of them. It is surrounded by mountains covered with dense forests: it contained, in 1827, not more that 1122 inhabitants, negroes and mulattoes. About twenty miles farther west is the Bay of Limones, or Puerto de Naos, which has an entrance five miles wide, free from danger. It is several miles deep, and several projecting points on its western side afford secure and commodious anchorage within them, especially the innermost, which is at present considered as the harbour. The climate is comparatively healthy, but it is not visited, the surrounding country being uninhabited. A few miles farther west is the harbour of Chagres, a little sandy bay, which is only open to westerly winds, and is formed by the mouth of the river of the same name. A ledge of rocks runs across its mouth, with not more than fifteen feet of water in the deepest place, and in many rising even to the surface. Under the most favourable circumstances no vessel drawing more than twelve feet can enter the harbour. Farther westward there is no harbour, except those afforded by the Chiriqui Lagoon.

The harbours on the shores of the Pacific are all within the Gulf of Panama. There appears to be no port west of Punta Mala. The opening of the Gulf of Panama is between Punta Francisco Salano on the continent of South America and Punta Mala, where it is about one hundred and fifty miles wide, which breadth it preserves for about ten miles northward, when it begins to contract. In the northern and narrower portion of the bay there is a group of islands, called Archipelago de las Perlas, on account of the pearls which were formerly procured in the adjacent sea in great abundance, and still are taken to a considerable amount. The largest of these islands, called Isla del Rey, rises to a considerable elevation. Most of the rivers which fall into this bay admit vessels of considerable burthen. They have, indeed, bars across their mouths, on which there is rarely more than two feet of water at low tides; but as the tides in this bay rise eighteen feet, the bars may be passed at high-water, and inside of them the harbours are deep. The rivers which are sometimes visited by vessels are the river Pacora, about eighteen miles east of the town of Panama, and the Rio Grande, which enters the sea about two miles west of that town.

Panama, the principal trading-place on this bay, stands on a tongue of land shaped nearly like a spear-head, extending a considerable distance out to sea, and gradually swelling towards the middle. The principal streets extend across the peninsula from sea to sea. The houses are of stone, generally two or three stories high, substantially built, and the larger houses have

courts or *patios*. The public edifices are—a beautiful cathedral, four convents, a nunnery of Santa Clara, and a college. As the sloping shores contiguous to the ground on which the town stands are dry at low-water to a considerable distance, the anchorage is about six or seven miles distant, where it is protected by a number of islands, the largest of which is called Perico, a name which is also applied to the harbour. These islands are high and well cultivated, and supplies of ordinary kind, including excellent water, may be obtained from most of them. In 1827 the town had nearly eleven thousand inhabitants. The harbour of Panama is usually visited by about thirty vessels, mostly from Guayaquil, Lambayeque, and Callao. They import sugar for the consumption of the country, and bullion and cacao for re-exportation. These goods are transported either on mules or by the natives on their shoulders from Panama to Cruces, on the Chagres river, where they are embarked in boats, and go down the river to Chagres.

The plans of communication proposed have been numerous, and, as may be supposed, as often prompted by the interest of particular parties as by any well-considered judgment of its being altogether the best or the easiest effected. As an instance, the 'Times' of the 12th of August last mentioned that the Mexican papers contained a long article showing the "advantage of effecting the communication by the way of Tehuantepec, rather than by that of Panama or Nicaragua." It then expatiates on the difficulties attendant on a passage across the isthmus, and concludes:—"The way by Tehuantepec seems never to have been thought of before 1842, when it was suggested by D. José Garay. The country has been surveyed at great expense, and the result is a belief that Tehuantepec will offer facilities beyond those of either of the other two places. Both on the north and on the south side are two ports which are formed by the mouths of two rivers, capable of being connected, and will admit of large vessels, while the waters flowing from a height will easily supply the canals."

The scheme is no doubt a very good scheme for Mexican interests. From the Gulf of Tehuantepec, in the North Pacific, the Chimilapa would be ascended as high as practicable, which would be connected by a canal with the Rio del Passo, a tributary to the Huasacualco, which falls into the Bay of Campeachy, in the province, and about one hundred miles north-east of the town of Vera Cruz. The Hon. P. Campbell Scarlett, notwithstanding the flourish of the Mexican paper as to the originality of the scheme, notices it in his 'Travels in South America in 1838,' and observes—"It is utterly out of the question to make it, under any circumstances, navigable for large vessels. A boat canal of communication, aided by rivers, would undoubtedly render the internal prosperity of a country where the distance from sea to sea is one hundred and fifteen geographical miles, infinitely greater than it is at present; but the realization of this project is more important to the state of Mexico than to the general interests of the commercial world." The canal would be required to be twenty miles long; the streams are winding, with occasional rapids; the harbour of the Huasacualco will at no time admit of vessels drawing ten feet of water, and Ventosa, the harbour of Tehuantepec, is only an open roadstead.

[To be continued.]

PROGRESSES OF QUEEN ELIZABETH.

No. XI.—1587-1591.

The splendid public funeral of Sir Philip Sidney, and the trial and execution of Mary, Queen of Scots, were the two chief events of the year 1587, in which Elizabeth appears to have remained either in London, Greenwich, or Richmond. In 1588, she, and every one else in the kingdom, was occupied with preparations for resisting the expected attack of the Spanish Armada. These events, even to her visit to the camp at Tilbury, belong rather to history than to an account of her Progresses, and are also too well known to require repetition. In 1589 and 1590, likewise, there were no Progresses properly so called, only a few mere visits to Walsingham at Barn Elms, Nottingham at Chelsea, and the like. On her return on some of these visits, the corporation of London met her in the suburbs: in January, 1589, for instance, the Lord Mayor issues a precept on the 28th, to the master and wardens of the Stationers' Company, requiring that "yourselves, with six of the comeliest personages of your said company, be ready at the Park Corner, above St. James's, on horseback, apparelled in velvet coats, with chains of gold, on Thursday, by two of the clock in the afternoon, to wait upon me and my brethren the aldermen to Chelsea, for the recreating of her Majesty accordingly. And also, that you provide six staff torches to light if need shall be required." The yearly justs in 1590 were rendered remarkable by the resignation of the championship by Sir Henry Lee to the Earl of Cumberland, in the presence of her Majesty. After exhibitions in the Tilt-yard, the knights advanced toward her, and she "did suddenly hear a music so sweet and secret as every one thereat greatly marvelled. And hearkening to that excellent melody, the earth as it were opening, there appeared a pavilion made of white taffeta, containing eight score ells, being in proportion like unto the temple of the Virgins Vestal. This temple seemed to consist upon pillars of porphyry, arched like unto a church: within it were many lamps burning. Also on the one side there stood an altar covered with cloth of gold, and thereupon two wax candles burning in rich candlesticks; upon the altar also were laid certain princely presents, which, after, by three virgins, were presented unto her Majesty." The presents consisted of a curiously-wrought white veil, and a cloak with buttons of gold, each button engraved with an "impress of excellent devise," and in each loop was a nobleman's badge, fixed to a pillar richly embroidered. A crowned pillar stood before the temple, and Sir Henry Lee, disarming himself, offered up his armour at the foot of it, and then, kneeling to the Queen, presented the Earl of Cumberland as his successor; who, being graciously accepted, was forthwith armed by Sir Henry, and mounted upon his own horse. To the music was sung, by "Mr. Hales, her Majesty's servant, a gentleman in that art excellent, and for his voice both commendable and admirable," the following very appropriate song, allusive to Lee's resignation and age:—

"My golden locks time hath to silver turn'd,
(Oh time too swift, and swiftness never ceasing!)
My youth 'gainst age, and age at youth hath spurn'd,
But spurn'd in vain; youth waneth by encreasing.
Beauty, strength, and youth, flowers fading been;
Duty, faith, and love, are roots and ever green.

My helmet now shall make a hive for bees,
And lovers' songs shall turn to holy psalms;
A man-at-arms must now sit on his knees,
And feed on prayers, that are old age's alms.
And so from court to cottage I depart;
My saint is sure of my unspotted heart.

And when I sadly sit in homely cell,
I'll teach my swains this carol for a song:—
Blest be the hearts that think my sovereign well;
Curs'd be the souls that think to do her wrong.
Goddess, vouchsafe this aged man his right,
To be your beadsman now, that was your knight."

In 1591 the Queen left Richmond, and visited Archbishop Whitgift, on the 11th of February, at Lambeth; and again, on the 13th, removing thence to Greenwich. On the 10th of May "the Queen came from Hackney to Theobalds," to visit Lord Burleigh, who, in consequence of the recent death of his wife, had become greatly dispirited, and wished to retire from his employments. Of this the Queen would not hear; and on this visit addressed a sort of playful ironical epistle "to the disconsolate and retired spryte, the Heremite of Tybole;" but expressing throughout her high consideration of him. The most remarkable matter, however, is a sort of interlude got up for her reception, it is conjectured, by secretary Sir Robert Cecil, Burleigh's son, though written by John Davies, which for gross flattery surpasses most of those, fulsome as they were, with which she was commonly addressed. We give the whole as a curiosity in the history of social manners:—

"A conference between a gentleman-usher and a post [messenger] before the Queen at Mr. Secretary's house.

"*P.* Is Mr. Secretary Cecil here? did you see Mr. Secretary? Gentlemen, can you bring me to Mr. Secretary?

"*U.* Mr. Secretary Cecil is not here. What business have you with him?

"*P.* Marry, sir, I have letters that import her majesty's service.

"*U.* Then you were best stay till he come; he was here even now, and will be again by-and-bye, if you have the patience to stay awhile.

"*P.* Stay! The matter requires such post-haste, as I dare not for my life stay anywhere till I have delivered all my letters; therefore, I pray, direct me where I may find him, for without doubt it is business that especially concerns the Queen's service.

"*U.* What a business is here with you. If the letters concern the Queen, why should not you deliver them to the Queen? You see she is present, and you cannot have a better opportunity, if the intelligence be so important, and concern herself, as you say.

"*P.* I cannot tell what I should do: they concern the Queen's service indeed; but they tell me they ought to be delivered to one of them to whose place it is proper to receive them.

"*U.* Queen's service! Post: what talk you? I know not what you think, but I am sure the world thinks she doth herself best service when all is done, for all her morose servants; though I confess (for honour's sake) all great princes must have attendants for their businesses.

"*P.* Is it so? Why, then, I pray thee, tell me what use doth she make of her servants?

"*U.* She makes the same use of them as the mind makes of the senses. Many things she sees and hears through them, but the judgment and election is her own.

"*P.* If, then, the use of their service be so small, how comes it that the reward of their service is so great?

"*U.* Oh, therein she respecteth her own greatness and goodness, which must needs be such as it is, though it find no object that is proportionable; as, for example, the sun doth cast his beams upon dark and gross bodies that are not alike capable of his light, as well as upon clear and transparent bodies which do more multiply his beams. Or if thou dost not understand this demonstration, I will give thee one that is more familiar. She doth in this resemble some gentle mistress of children, who, when they guide the hands of their scholars with their own hands, and thereby do make them to write fair letters, do yet to encourage them give them as much praise as if themselves had done it without direction.

"*P.* Well, I am half persuaded to deliver the letters to her own hand; but, sir, they come from the Emperor of China, in a language that she knows not.

"*U.* Why, then, you were very simple, Post: though it be so, yet these princes (as the Great Turk and the rest) do always send a translation in Italian, French, Spanish, or Latin, and then all is one to her.

"*P.* Doth she understand these languages, and never crossed the seas?

"*U.* Art thou a post, and hast ridden so many miles, and met with so many men; and hast thou not heard that all the world knows that she speaks and understands all the languages in the world which are worthy to be spoken or understood?

"*P.* It may be she understands them in a sort; well for a lady, but not so well as secretaries should do, that have been great travellers; and it is the part of every secretary's possession [? profession] to understand so many languages.

"*U.* Tush! what talkest thou of secretaries? As for one of them, whom thou most askest for, if he have anything that is worth talking of, the world knows well enough where he had it, for he kneels every day where he learns a new lesson: go on, therefore, deliver thy letters; I warrant thee she will read them if they be any Christian language.

"*P.* But is it possible that a lady born and bred in her own island, having but seen the confines of her own kingdom, should be able without interpreters to give audience, and answer still to all foreign ambassadors?

"*U.* Yea, Post; we have seen that so often tried, that it is here no wonder. But, to make an end, look upon her. How thinkest thou; dost thou see her? Say truly, sawest thou ever more majesty or more perfection met together in one body? Believe me, Post, for wisdom and policy she is as inwardly suitable as externally admirable.

"*P.* Oh! sir; why now I stand back the rather, you have so daunted my spirits with that word; for, first, you say she hath majesty, and that, you know, never likes audacity. Next, you say she is full of policy; now, what do I know, if policy may not think fit to hang up a Post if he be too saucy? No; I have learned a better lesson at a grammar-school: non est bonum ludere cum sanctis. Farewell, good sir: I will go to one of the secretaries, come what will of it.

"*U.* Ah! simple Post, thou art the wilfullest creature that liveth. Dost thou not know that beside all her perfections, all the earth has not such a Prince for affability; for all is one, come gentleman, come servingman, come ploughman, come beggar, the hour is yet to come that ever she refused petition. Will she then refuse a letter when that comes from so great an Emperor, and for her service? No, no! do as I bid thee; I should know something, that have been a quarter-master these fifteen years; draw near her, kneel down before her, kiss thy letters, and deliver them, and use no prattling while she is reading; and if ever thou have worse words than 'God have mercy, fellow,' and 'Give him a reward,' never trust me while thou livest.

"*P.* Well, God bless me, and God save her. Even God's will be done. I am half of thy belief, and I will prove my destiny. 'Fair Queen, here are letters from the Emperor of China, who doth salute you, and I, your vassal, am joyful to see you, who never saw your Majesty, neither in the East Indies nor in the West, nor any country where there is neither man or beast."

"These things to hear," the heaping on of all sorts of accomplishments—affability, wisdom, policy, but above all, the majesty and perfection met together in one externally admirable body,—"did the Queen seriously incline." The Cecils were certainly eminent as statesmen in its highest sense; they were hardly less

distinguished as courtiers in its lowest, and they evidently knew and endeavoured to gratify the coarse and insatiable appetite of their sovereign for flattery. Of this they gave other proofs in the reign of Elizabeth's successor.

On the 10th of July she was still with Lord Burleigh, but at his residence in town, Burleigh House, afterwards Exeter Change, whither she went to see the Earl of Essex's house in Covent Garden; and on the same day Lord Hunsdon, her chamberlain, wrote to Sir William More, bidding him prepare for another visit on her way to Portsmouth. He says, "She is very desirous to go to Portsmouth and Cowdray, if it be possible, but none of us all can set her down anywhere to lie at between your house and Cowdray." This is a curious difficulty, and affords a striking proof of the bad state of the roads, as Cowdray is little more, if any, than twenty miles distant from Loseley. But the Chamberlain adds, "Though she cannot pass by Petworth and Cowdray, yet she will assuredly come to your house, and so towards Portsmouth such other way as shall be set down to her." We have no particulars of the visit, but she did go to Sir William's and thence to Cowdray, dining at the Farnham Castle, the residence of the Bishop of Winchester, on her way. Her magnificent reception at Cowdray we must leave for another opportunity.

Whirlpool of Charybdis.—The agitation of the waters which is constantly observed near Messina, and which is usually designated the whirlpool of Charybdis, is now well known to be unaccompanied by any vortiginous motion by which vessels might be absorbed, and is, rather, an incessant undulation of the water. The agitation is said to exist in several different places at the same time, within the circumferences of circles whose diameters, when the wind is moderate, do not exceed one hundred feet, and is caused by the wind acting obliquely on the rapid current which sets towards the faro, or lighthouse, from the north during six hours, and from the south during the next six hours, and so on alternately; the changes taking place respectively with the rising and setting of the moon. Spallanzani, who was rowed over the spot when the wind was light, experienced no danger, though the boat was much tossed by the waves: he was informed, however, that when the wind is high the swelling of the waves is more violent and extensive, so that small vessels which are driven within the limits of the agitation may be sunk by the waves breaking over them, and large ones may be driven on the Italian shore, where they are sometimes wrecked on the rock of Scylla. The dashing of the waves on the hollow rocks about Cape Peloro produces a noise which is said to resemble the barking of dogs; and it is probable that these sounds gave rise to the fable that a female monster, surrounded by ferocious dogs and wolves, lay there in wait to devour the mariners who might be wrecked on the coast.—*Penny Cyclopædia.*

Parmesan Cheese.—The Lodigiano, the country about Lodi, is the native seat of the cheese called Parmesan, but which is almost wholly made in this district: the Perminiani, however, having been the first to export the article, it acquired their name. Others, on the contrary, say that a princess of Parma having introduced it at the French table, it received its denomination from *her* excellency, as well as *that* of the cheese. The French *gastronomes* maintain that it is with cheese as with wine, namely, that each species has its own *smack*, which cannot be produced elsewhere, resulting partly from natural causes and partly from the mode of manipulation; but that in cheese the co-operating causes are much more numerous than in wine; the nature of the soil, the plants upon which the cows feed, the water they drink, the air they breathe, the construction of the cow-house, the quality of the rennet, nay even the complexion of the dairymaid, are all efficient causes. To carry on the business of a cheese-dairy to advantage, the milk of at least fifty cows is needed; but the land being very much divided into small holdings, many of the farmers have not a sufficient extent of pasturage. They therefore join with their neighbours in a kind of partnership, the milk being brought into a common dairy, where it is kept in very large copper vessels, and the produce divided. The deep yellow colour is given by saffron. The pasturage is most rich: when cut for hay it gives three crops in the year.—*Murray's Handbook of Italy.*

Calls of American Birds.—If superstition takes alarm at our familiar and simple species, what would be thought by the ignorant of a South American kind, large as the Wood-Owl, which, in the lonely forests of Demerara, about midnight breaks out, lamenting like one in deep distress, and in a tone more dismal even than the painful hexachord of the slothful Aï. The sounds, like the expiring sighs of some agonizing victim, begin with a high loud note, *ha, ha, ha ha ha! ha! ha!* each tone falling lower and lower, till the last syllable is scarcely heard, pausing a moment or two between this reiterated tale of seeming sadness. Four other species of the Goatsucker, according to Waterton, also inhabit this tropical wilderness, among which also is included the *Whip-poor-Will.* Figure to yourself the surprise and wonder of the stranger who takes up his solitary abode for the first night amidst those awful and interminable forests, when, at twilight, he begins to be assailed familiarly with a spectral equivocal bird, approaching within a few yards, and then accosting him with *who-are-you, who-who-who-are-you?* Another approaches and bids him, as if a slave under the lash, *work-away, work-work-work-away;* a third mournfully cries *willy-come-go! willy-willy-willy-come-go!* and as you get among the highlands, our old acquaintance vociferates *whip-poor-will, whip-whip-whip-poor-will!* It is therefore not surprising that such unearthly sounds should be considered in the light of supernatural forebodings issuing from spectres in the guise of birds.—*Nuttall's Manual of the Ornithology of the United States and of Canada.*

Crab-catching on the Scottish Coast.—We soon perceived two men in a small craft: their little boat hung motionless on the then waveless mirror of the bay, in about ten feet depth of water; and after for a minute or thereby holding their faces close upon the surface, they seemed suddenly to pull a long pole out of the water, with something adhering to its extremity. We soon found that they were taking advantage of the glassy stillness of the water, to overlook the early walk of the crabs. They no sooner saw these crusty crustaceans on the subaqueous sand, than they poked them behind with their long staves. the crabs turned round and seized upon the poles. These latter were slightly shaken by the fishermen, as if in pain or terror; the angry creatures clung all the closer, and were then rapidly hoisted into the boat.—*Wilson's Voyage round the Coast of Scotland.*

Serpent-Charmer.—One of these jugglers, or charmers, was by far the most expert and daring fellow I had seen perform with snakes; and he completely astonished us by the manner in which he pulled about, and treated with the greatest indifference and coolness, a very fine Cobra de capello, or Noya, as the Kandyans call it, about three feet and a half long, which he had brought with him. He handled it with great roughness, yet perfect confidence: he also struck and threatened it in so daring a way, that at last I suspected its poison-fangs had been broken or extracted; but this I found was not the case; for after he had taken much pains in order to irritate it, and soothe it when enraged, and had even put it into his bosom, I told one of the servants to desire him to open its mouth—not expecting that he would do so—and show me whether the poison-fangs were extracted or not. He did so without the least hesitation; and there they certainly were, and in the most perfect state! Indeed I confess that, in even going up to examine them, a strange sort of thrilling sensation ran through my whole frame, at the idea of being bitten by such a terrible yet beautiful creature. I then desired the servant to ask him if the snake would bite me if I touched it. He instantly replied, that it certainly would do so; and, seemingly afraid lest I should venture too near it, he, in great haste, put it back into the bag in which he had brought it.—*Lieut.-Col. Campbell's Excursions, Adventures, and Field-Sports in Ceylon.*



[Andrea Mantegna, with a Group from his Triumph of Julius Cæsar.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XVII.

ANDREA MANTEGNA. b. 1430. d. 1506.

FOR a while we must leave beautiful Florence and her painters, who were striving after perfection by imitating what they saw in nature—the common appearances of the objects, animate and inanimate, around them—and turn to another part of Italy where there arose a man of genius who pursued a wholly different course; at least he started from a different point, and who exercised for a time a great influence on all the painters of Italy, including those of Florence. This was ANDREA MANTEGNA, particularly interesting to English readers, as his most celebrated work, the Triumph of Julius Cæsar, is now preserved in the palace of Hampton Court, and has formed part of the royal collection ever since the days of Charles I.

ANDREA MANTEGNA was the son of very poor and obscure parents, and born near Padua in 1430.* All we learn of his early childhood amounts to this,—that he was employed in keeping sheep, and being conducted to the city, entered, we know not by what chance, the school of Francesco Squarcione.

About the middle of this century, from which time we date the revival of letters in Europe, the study of the Greek language and a taste for the works of the classical authors had become more and more diffused

* The date of Mantegna's birth and death were long subjects of uncertainty and controversy. According to some authors he was born in 1451, and died in 1517; but the best and latest authorities are now agreed upon the dates as given in the text.

through Italy. We are told that "to write Latin correctly, to understand the allusions of the best authors, to learn the rudiments at least of Greek, were the objects of every cultivated mind." Classical literature was particularly studied at the University of Padua. Squarcione, a native of that city and by profession a painter, was early smitten with this passion for *the antique*. He not only travelled over all Italy, but visited Greece in search of the remains of ancient art. Of those which he could not purchase or remove, he obtained casts or copies; and, returning to Padua, he opened there a school or academy for painters, not indeed the most celebrated nor the most influential, but at that time the best attended in all Italy. Squarcione numbered one hundred and thirty-seven pupils, and was considered the best teacher of his time. Yet of all this crowd of students the names of three only are preserved, and of these only one has attained lasting celebrity. By Squarcione himself we hear only of one undoubted picture displaying great talent; but it appears that he painted little; employed his scholars to execute what works were confided to him; and gave himself up to the business of instruction.

Andrea Mantegna was only known in the academy of Squarcione as a poor boy, whose talent and docility rendered him a favourite with his master. He worked early and late, copying with assiduity the models which were set before him, drawing from the fragments of statues, the busts, the bas-reliefs, ornaments, and vases with which Squarcione had enriched his academy. At the age of nineteen Andrea painted his first great picture, in which he represented the four evangelists; his imagination and his pencil familiarized only with the forms of classical art, he gave to these sacred personages the air and attitude of heathen philosophers, but they excited nevertheless great applause.

At this time the Venetian Jacopo Bellini, father of the two great Bellini, of whom we shall have to speak presently, arrived in Padua, where he was employed to paint some pictures. He was considered as the rival of Squarcione, both as a painter and teacher. Andrea was captivated by the talents and conversation of the Venetian; and yet more attracted by the charms of his daughter Nicolasa, whose hand he asked and obtained from her father. Jacopo Bellini was of opinion that he who had given such early proofs of assiduity and ability must ultimately succeed; and though Andrea was still poor and but little known, and the Bellini family already rich and celebrated, he did not hesitate to bestow his daughter on the youthful and modest suitor. This marriage, and what he regarded as the revolt of his favourite disciple, so enraged Squarcione that he never forgave the offence. Andrea having soon after completed a picture which excelled his first, his old master attacked it with the most merciless severity, and publicly denounced its faults: the figures he said were stiff, were cold; without life, without nature; and observed sarcastically that Andrea should have painted them like marble, and then the colour would have harmonized with the drawing. This criticism came with a particularly ill grace from him who had taught the very principles he now condemned, and Andrea felt it bitterly; but the Italian annotator of Vasari remarks very truly, that severe and unjust censure, while it crushes mediocrity, acts as a spur and excitement to real genius; and that excessive praise often turns the brain of the weak man while it renders the man of genius slothful and careless. Andrea showed that he had sufficient strength of mind to rise superior to both praise and censure; he felt with disgust and pain the malignity of his old master; but he knew that much of his criticism was just. Instead of showing any sense of injury or discouragement, he set to work with fresh ardour; he drew and studied from nature instead of confining himself to the antique; he imitated the fresher and livelier colouring of his new relations, the Bellini; and his next picture, which represented a legend of St. Christopher, was so superior to the last, that it silenced the open cavilling of Squarcione, though it could not extinguish his animosity, perhaps rather added to it; for Andrea had introduced among the numerous figures in his fresco that of Squarcione himself, and the likeness was by no means a flattering one. Notwithstanding the admiration which these and other works excited in his native city, the enmity of his old master seems to have rendered Padua intolerable as a residence. Andrea therefore went to Verona, where he executed several frescoes and some smaller pictures; and there being invited to Mantua by Ludovico Gonzaga, he finally entered the service of that prince. The native courtesy of Andrea's manners, as well as his acquired knowledge and his ability in his profession, recommended him to his new patron, who loaded him with honours and favours.

Some years after he had taken up his residence in Mantua, and had executed for the Marquis Ludovico and his son and successor Frederigo several works which yet remain, Andrea was invited to Rome by Pope Innocent VIII., to paint for him a chapel in the Belvedere. The Marquis of Mantua permitted him to depart but for a time only, and accompanied the permission by gifts, by letters of recommendation to the pontiff; and the more to show the esteem in which he held him, bestowed on him the honour of knighthood.

Mantegna, on his arrival in Rome, set himself to work with his characteristic diligence and enthusiasm, and covered the walls and the ceiling with a multiplicity of subjects, executed, says Vasari, with the delicacy of miniatures. These beautiful paintings existed till late in the last century, when Pius VI. destroyed the chapel to make room for his new museum. While Andrea was employed at Rome by Pope Innocent, a pleasant and characteristic incident occurred, which does honour both to him and to the pope. His holiness was at this time much occupied and disturbed by state affairs; and it happened that the payments were not made with the regularity which Andrea desired. The pope sometimes visited the artist at his work, and one day he asked him the meaning of a certain female figure on which he was painting. Andrea replied, with a significant look, that he was trying to represent *Discretion*. The pope, understanding him at once, replied, "If you would place Discretion in fitting company, you should paint *Patience* at her side." Andrea took the hint, and said no more; and when his work was completed the pope not only paid him the sums stipulated, but rewarded him magnificently besides. About the year 1487 he returned to Mantua, where he built himself a magnificent house, painted inside and outside by his own hand, and in which he resided in great esteem and honour until his death in 1505. He was buried in the church of his patron saint, St. Andrew, where his monument in bronze and several of his pictures may yet be seen.

The existing works of Andrea Mantegna are so numerous that we must content ourselves with recording only the most remarkable, and the occasions on which they were painted.

In the year 1476, Andrea executed for his friend and patron, Ludovico Gonzaga, the famous frieze representing in nine compartments the Triumph of Julius Cæsar, after his conquest of Gaul. These were placed round the upper part of a hall in the palace of San Sebastiano, at Mantua, which Ludovico had lately erected. They hung in this palace for a century and a half. When Mantua was sacked and pillaged in

1629, they, with many other pictures, escaped; the Duke Carlo Gonzaga, reduced to poverty by the vices and prodigality of his predecessors, and the wars and calamities of his own time, sold his gallery of pictures to our King Charles I. for 20,000*l*., and these and other works of Andrea Mantegna came to England with the rest of the Mantuan collection. When King Charles's pictures were sold by the parliament after his death, the Triumph of Julius Cæsar was purchased for 1000*l*., but on the return of Charles II. it was restored to the royal collection, how or by whom does not appear. The nine pictures now hang in the palace of Hampton Court. They are painted in distemper on twilled linen which has been stretched on frames, and originally placed against the wall with ornamented pilasters dividing the compartments. In their present faded and dilapidated condition, hurried and uninformed visitors will probably pass them over with a cursory glance, yet, if we except the Cartoons of Raphael, Hampton Court contains nothing so curious and valuable as this old frieze of Andrea Mantegna, which, notwithstanding the frailty of the material on which it is executed, has now existed for three hundred and sixty-seven years, and, having been frequently engraved, is celebrated all over Europe.

Andrea retained through his whole life that taste for the forms and effects of sculpture which had given to all his earlier works a certain hardness, meagreness, and formality of outline neither agreeable in itself nor in harmony with pictorial illusion; but in the Triumph of Julius Cæsar the combination of a sculptural style with the aims and beauties of painting was not, as we usually find it, misplaced and unpleasing; it was fitted to the designed purpose and executed with wonderful success; the innumerable figures move one after another in a long and splendid procession, as in an ancient bas-relief, but coloured lightly, in a style resembling the antique paintings at Pompeii. Originally it appears that the nine compartments were separated from each other by sculptured pilasters. In the first picture, or compartment, we have trumpets, incense burning, standards borne aloft by the victorious soldiers. In the second and third the trophies and statues of gods carried off from the enemies. In the fourth more such trophies, with the oxen crowned with garlands, for the sacrifice. In the fifth picture are four elephants, adorned with rich garlands of fruits and flowers, bearing on their backs magnificent candelabra, and attended by beautiful youths. In the sixth are figures bearing vases, and others displaying the arms of the vanquished. The seventh picture shows us the unhappy captives, who, according to the barbarous Roman custom, were exhibited on these occasions to the scoffing and exulting populace; there is here a group of female captives of all ages, among them a young dejected bride-like figure, a woman carrying her infant children, and a mother leading by the hand her little boy, who lifts up his foot as if he had hurt it; this group is particularly pointed out by Vasari, who praises it for its nature and its grace. In the eighth picture we have a group of singers and musicians, and among them is seen a youth whose unworthy office it was to mock at the wretched captives, in which he is assisted by a chorus of the common people; a beautiful youth with a tambourine is distinguished by singular spirit and grace. In the last picture appears the conqueror, Julius Cæsar, in a sumptuous chariot richly adorned with sculptures in the antique style. He is surrounded and followed by a crowd of figures, and among them is seen a youth bearing aloft a standard on which is inscribed Cæsar's memorable words, *Veni, Vidi, Vici*; "I came, I saw, I conquered."

The inconceivable richness of fancy displayed in this triumphal procession, the numbers of figures, of objects of every kind, the propriety of the antique costumes, ornaments, armour, &c., with the scientific manner in which the perspective is managed, the whole being adapted to its intended situation, far above the eye, so that the under surfaces of the objects are alone visible, (as would be the case when viewed from below,) the upper surfaces vanishing into air; all these merits combined render this series of pictures one of the grandest works of the fifteenth century, worthy of the attention and admiration of all beholders.

When the great Flemish painter, Rubens, was at Mantua in 1606, he was struck with astonishment on viewing these works, and made a fine copy in a reduced form of the fifth compartment, which copy is now in the possession of Mr. Rogers the poet.

Another of the most celebrated of Mantegna's works is the great picture now in the Louvre, at Paris, and called by the Italians "*la Madonna della Vittoria,*" the Madonna of Victory. The occasion on which it was painted recalls a great event in history, the invasion of Italy by Charles VIII. of France. Of all the wars undertaken by ambitious and unprincipled monarchs, whether instigated by revenge, by policy, or by rapacious thirst of dominion, this invasion of Italy, in 1495, was the most flagitious in its injustice, its folly, and its cruelty. Charles, after ravaging the whole country from the Alps to Calabria, found himself obliged to retreat, and on the banks of the Taro was met by Gian-Francesco, Marquis of Mantua, the son and successor of Frederigo, at the head of an army. On the part of the Italians it was rather a victory missed than a victory won; for the French continued their retreat across the Alps, and the loss of the Italians was immense. The Marquis of Mantua, however, chose to consider it as a victory: he built a church on the occasion, and commanded Andrea Mantegna to paint a picture for the high altar, which should express at once his devotion and his gratitude. Considering the subject and the occasion, the French must have had a particular and malicious pleasure in placing this picture in the Louvre, where it now hangs, at the upper end of that immense gallery.

It represents in the centre, under a canopy or arbour composed of garlands of foliage and fruit, and seated on a throne, the Virgin Mary, who holds on her knees the infant Saviour. On her right stand the archangel Michael and St. Maurice in complete armour. On the left are the patron saints of Mantua, St. Longinus and St. Andrew with the infant St. John; more in front, on each side, are the Marquis of Mantua, and his wife, the celebrated and accomplished Isabella d'Este, who kneeling, return thanks for the so-called victory over the French. The figure of the Marchesa Isabella is still, in the French catalogue of the Louvre, styled St. Elizabeth, an error pointed out long since by Lanzi and others. This picture was finished in the year 1500, when Andrea was 70; in beauty and softness of execution it exceeds all his other works, while in the poetical conception of the whole, the grandeur of the saints, and the expression in the countenance of Gonzaga as he gazes upwards in a transport of devotion, it is worthy of his best years. In the Louvre are three other pictures by Andrea Mantegna. One is the Crucifixion of our Saviour, a small picture remarkable for containing his own portrait in the figure of the soldier seen half length in front. Another, an allegorical subject, represents the Vices flying before Wisdom, Chastity, and Philosophy, while Justice, Fortitude, and Temperance return from above, once more to take up their habitation among men. Another picture, of exceeding beauty, represents the Muses dancing to the sound of Apollo's lyre: Mars, Venus, and Cupid stand on a rocky height, looking upon them, while Vulcan is seen at a distance threatening his faithless consort. In this

little picture Mantegna seems inspired by the very spirit of Greek art: the Muses are designed with exquisite taste and feeling; it is probably the chef-d'œuvre of the artist in his own particular style, that for which his natural turn of mind and early studies under Squarcione had fitted him. In general, his religious pictures are not pleasing; and many of his classical subjects have a tasteless meagreness in the forms, which is quite opposed to all our conceptions of beauty and greatness of style; but he has done grand things. Besides the works already mentioned, there are four in the museum at Berlin, and others at Vienna, Florence, and Naples. Of many disciples formed by Andrea Mantegna not one attained to any fame or influence in his art; they all exaggerated his manner and defects, as is usual with scholars who follow the manner of their master. His two sons were both artists, studious and respectable men, but neither of them inherited the genius of their father. Ariosto, in a famous stanza of his great poem ('Orlando Furioso,' cxxxiii., st. 2), in which he has commemorated all the leading painters of his own time, places the name of Andrea Mantegna between those of Leonardo da Vinci and Gian Bellini.



[Roman Peasants.]

ROMAN PEASANTRY

THIS is another of Bartolommeo Pinelli's designs of mingled customs and costumes. The picturesquely attired peasant-women are from some village on the hills which gird in the Roman Campania and the Pontine Marshes. The style of the head-drapery—which consists simply of a broad linen napkin or towel gracefully folded, and with or without a fringe—is common to many districts throughout the south of Italy, though by no means to all of them. In ordinary cases the fringe is but a loosened part of the linen napkin; but the better-conditioned of these Paesane often display on Saints' days and *Giorni di Festa* (holidays) fringes made of silk and gold thread. Although they call it by the very homely and unpoetical name of towel (*tovaglia*,* whence we have derived our word, or the name of the thing with which we wipe our hands and faces), or by the name of il panno (the cloth): this female adornment figures conspicuously in the popular amatory poetry. The love-smitten Roman or Neapolitan swain sings of it, when describing the charms and graces of his *bell' idolo*, as our primitive English and Scottish song-makers used to sing of the "flowing auburn hair," "lint-white locks," the blue ribbons to tie up the bonnie hair, the snood, &c. But these southern swains are often very bold, figurative, and almost oriental in their language, making a great deal more of their fair-one's linen towel than our songsters and sonnetteers ever ventured to make of flowing hair or silken ribbon. We have heard them compare the towel to a ship or sail at sea, to a summer cloud, to a comet, a star, the moon, the froth and foam

* Tovaglia is not provincial or patois, but good Tuscan. But in Tuscan it signifies nothing but a towel. The Romans, if we remember right, often call the tovaglia or panno, *la pezzuola*, which, in pure della Crusca Italian, signifies the pocket-handkerchief

on the sea-shore, the snow on the mountain-top, the glory round the head of a Saint, the very head-gear of the blessed Madonna herself, that

"Maid, yet mother,
Goddess, yet woman—like none other,
That still remembereth in Heaven
The heart—the hopes—of woman given."

We remember hearing an amorous or musical peasant from the old hill-town of Capaccio, singing on the shady side of one of the massy columns of the Pæstan Greek temples, and using this bold figure, in his Neapolitan patois—

"Deh! quanno tu metti 'sta tovaglia bionna,
Mi pari un' antenna in auto mare!"

"Ah! when you put on your white* towel,
You seem to me a ship on the high sea!"

These rustic verses are transmitted orally from generation to generation, and are preserved solely by memory: neither type and press, nor even pen being employed to keep them from oblivion and give them what poets call immortality. They have, in short, been preserved like most of our nursery rhymes, and, like some of those simple productions, many of them are evidently of considerable antiquity, and are likely to remain in the popular mind for ages to come. Some of them, not of the amatory kind, are not much to be commended. The song most in vogue among the lazzaroni of Naples is all about *catching fleas*—an art in which they have great practice, and in which they have attained to a rare degree of skill. As Mr. Halliwell has made an incomplete collection of our nursery rhymes, so several Italians have made partial collections of their popular songs, writing them down from memory, or taking them from the lips of the singers. We believe that the best of these collections is the one published about ten years ago by the Cavalier Visconti, entitled 'Canti Popolari della Marittima e della Campagna;'† but even this is very incomplete, and is confined to a small part of the Roman States. It does not include the Marches of Ancona, or Umbria, or the most mountainous parts of the States of the Church; and we have generally observed in Italy, as in other countries, that the inhabitants of mountainous regions are more addicted to music and song and traditions than are the dwellers in plains. The Neapolitan collections we have seen are confined almost entirely to the Canti Popolari of the city of Naples, the Campagna Felice, and the rest of the province of the Terra di Lavoro; but every other province, and nearly every district in it, have, together with a distinctive costume for their women, some particular song or songs of their own. There are a few canti or canzoni that are sung all over the Neapolitan kingdom. Among these are the well-known Tarantella, beginning

"Sei bella, sei buona, sei tutt' amorosa;"‡

and the droller ditty,

"La luna sta in mezzo lo mare,
Mamma mia maritime tu!—
Figlia mia che t' aggio à dare?
Mamma mia pensaci tu.
E la luna sta in mezzo lo mare!" &c.

"The moon is in the middle of the sea:
Mamma mine, get me a husband!—
Daughter mine, whom have I to give thee?—
Mamma mine, think of that yourself.
And the moon in the middle of the sea!"

Except Mr. Charles Mathews—the clever son of a clever father—who has resided a long time in the south of Italy, and whose other imitations of the strange manners of the Neapolitans (including that of their tarantella or national dance) are all perfect in their kind, we never met with the foreigner that could do justice to these strange wild popular songs, or sing them as they are sung by the common people in the land of the vine, the myrtle, and maccaroni. A traveller might spend his time worse than in collecting these primitive, inedited, unprinted compositions, throughout the Peninsula; but the task would require a perfect familiarity with the humorous and numerous patois or dialects of Italy, for, in this particular, as well as in the costume of the women, there is some variety or difference in nearly every district; while, between the Piedmontese and Milanese in Upper Italy, and the Neapolitan and Calabrian in Lower Italy, and the dialect of Sicily, the difference is so great as almost to make the dialects appear distinct languages. The Milanese have made more than one collection of the popular songs in their own patois; and a collection of Sicilian songs, of the rudest and most primitive sort, but with occasional beauties mingled with their quaintness, was published a few years ago at Palermo. But in addition to these old household verses, the productions of unknown and unnamed peasants, the Sicilians possess—also in their own beautiful dialect, in which the soft and sweet Italian is made softer and sweeter still by the multiplication of the softest-sounding of the vowels—the exquisite, the classical songs, pastorals, and piscatory eclogues of the Abbate Meli, whose verses are more honeyed than his name, and who, more than any writer in any language, merits the name of "the modern Theocritus," the name which his admiring countrymen, and the Italians generally, have long bestowed upon him. Meli was no cold and pedantic imitator of the Greek and Latin poets; his pictures are all pictures from real life—from the shepherds and husbandmen he saw on his own native hills and in his own familiar valleys, and the fishermen and mariners on the bold Sicilian coasts—and they are as true and faithful in their way, as those of our great painter of humble life, Crabbe. His love-songs, in the vernacular dialect, are familiar to every Sicilian, however lowly and unlettered be his condition; and they have all been set to music for the favourite native instrument, the guitar.* His Doric notes, as compared to the Tuscan, or pure Italian, are like Burns's sweetest and softest Scotch compared with our standard English. But the song upon a pacsana's head-cloth has led us into a digression.

In some districts the tovaglia, or panno, is raised considerably from the head, and is kept in its position by a large silver pin or bodkin from twelve to fifteen inches long, and ornamented at one end by being wrought into the shape of the feather end of an arrow, or into some other graceful form. The most beautiful and the most perfect specimens of these head-dresses are to be seen in the islands of Ischia and Procida.

The stately matron in our cut, with the curiously shaped vase upon her head, is wearing her holiday boddice. This part of the attire is often tastefully embroidered, and the material of the embroidery is not unfrequently gold or silver thread of the purest kind. And it is curious to observe that in their rings,

* The word *bionna* (in Tuscan, or pure Italian, *bionda*) of course means *brown* or *blonde*; but as the linen head-napkin is always bleached, and generally kept clean and of a snowy whiteness, our Capaccio friend must have turned *bianca* (white) into *bionna* for the sake of a rhyme.

† The Marittima is that part of the Roman States which lies on the Mediterranean (not the Adriatic) shore; the Campagna is the Campania of Rome, which stands between the Marittima and the mountains, including the lower ranges of the latter.

‡ Thou art beautiful, thou art good, thou art all amorous, or made to be beloved.

* Meli died, at an advanced age, in 1815, shortly after collecting and publishing an edition of his works, in seven volumes.

ear-rings, and other ornaments, the poorest of these peasantry, if they possess any such things at all, have them always made of the purest gold or silver that can be procured. The workmanship is often rough, but the material is always rich. Our powerfully alloyed jeweller's gold, whatever might be the beauty of the workmanship, would excite the contempt of these humble matrons. These facts were well known to the lawless soldiery of Bonaparte, and many a marauding Frenchman lost his life for having insulted these women and for having torn the massive gold ear-rings from their ears and their rings from their fingers. When the wars of the French revolution succeeded half a century of peace and prosperity, the better class of the Italian peasantry were well provided with these and other feminine ornaments; and few were the houses without a little plate for the table, or without its silver crucifix. Wars and revolutions, a constantly increasing taxation, and impolitic restrictions upon the freedom of trade, have swept away most of these indications of prosperity; but still far more remains than a hasty observer would be inclined to believe. The way to judge of the fact is to attend some of the great rural festivals, when every paesana displays all the finery she possesses. We have seen, even in some of the remotest districts of the Roman and Neapolitan states, on these hard-working and hard-faring peasant women more gold ear-rings and rings than would have filled the bushel measures which Hannibal is said to have filled with the rings of the Roman knights and consuls that fell in the disastrous battle of Cannæ. They generally descend from generation to generation as a sort of heir-looms. Some of them show by their workmanship, and by the consumption of the gold, which long wear and friction have occasioned, that they have not been made in our days, but have been worn by those who have long been dead and forgotten. When a young paesana marries, a list is taken of such articles as she brings with her to her husband; and in the provinces nearest to the city of Naples it used to be a common thing to insert in the simple marriage contract an obligation on the part of the sposo to conduct his sposa every year to two or more noted festivals (leaving ten or a dozen others to chance, or to the goodman's good-will or pleasure), where one of the lady's greatest delights would be to display her gold and her corals, her best head-dress and her embroidered boddice. The most noted of all these festivals (which, though accompanied with singing and dancing, eating and drinking, and with a shouting and noise which must be heard to be understood, have all originated in and are connected with some saint or Madonna-worship, or some religious worship) is that of the Madonna of Piè di Grotta, which is held in the city of Naples, or rather in the Posilippo suburb of that densely peopled capital, close by the entrance of that grotta or tunnel which the earliest Greek conquerors and colonists cut through the tufo mountain of Posilippo to open an easy road from Naples to the ancient town of Pozzuoli, the still more ancient Cumæ, where the Sibyl had her temple and mysterious shrine, and to the matchless coast, where, at a later period, the Roman patricians, the richest and most luxurious of the conquerors of the world, built the town of Baiæ, and raised those splendid marine villas whose basements are now seen deep under the surface of the water of the bay.* The faithful pencil of Mr. Uwins has made the walls of English houses and galleries live and glow with some of the lifeful, joyous, sunny scenes of this far-famed festival, and has familiarised untravelled Englishmen with some of the pastimes of Piè di Grotta; but it would require many pencils and a great variety of talent and artistic power to do anything like full justice to that festival of festivals.

* For a view and description of the Grotto of Posilippo, see 'Penny Magazine,' vol. i., p. 285.

One of the greatest charms of the great Neapolitan festi arises out of the variety of the costumes of the women, and the distinctive style and character of each. A practised eye—any person who has rambled about the country with his eyes open—can tell, by the costume, the district, the mountain, hill, or valley, or the sea-shore, town, or village, or the island from which each of the commingling groups have come to enjoy this *giorno beato*, this blessed day! What we call fashion is utterly unknown to these paesane: every woman dresses precisely as her mother and grandmother did before her; and one district never adopts or copies from the costume of another. That custom of wearing the cast-off worn-out clothes of their betters or their superiors in the adventitious circumstances of rank and fortune, which too often gives such a beggarly, incongruous, grotesque appearance to our own peasantry, and which commonly drives all their native picturesqueness from the Irish peasantry, is equally unknown to these Italian peasants, whether males or females. An English woman may be seen making hay in a tattered muslin dress that has once been worn by a duchess or a countess or other modish dame; and nothing so common as to see an Irishman driving pigs in what was once the exquisitely-cut coat of a dandy, or the black, trim coat of a clergyman. But a Roman or a Neapolitan peasant, or any man or woman of any of the rural districts of Italy, would no more think of wearing such things, or putting on any dress except such as belongs to their condition and locality, than they would think of tattooing themselves and going without any garments at all. A paesana would consider that she was degraded and disgraced, that her caste was lost, and her reputation gone for ever, if once she were forced to show herself in the dress (whether span new or cast off) of a city madam, or in any other attire excepting that which her mother had worn and taught her to make. Perhaps there is some close connection between these ancient and deep-rooted feelings and the superior quality of the rags which we import from Italy for our paper manufactures. There the rags do not go through the wear and tear of many successive grades and conditions, ending with the lowest and poorest of all. In England the old-clothes men are mortal foes to propriety of costume; and when an old coat has gone through every gradation here, a lower still is found in the sister island, and it is shipped off for the land of the shamrock and shillelagh.*

JUNCTION OF THE ATLANTIC AND PACIFIC OCEANS.

[Continued from page 406.]

The remaining plans are all connected with the isthmus, and having dismissed the most northerly one of Mexico, we will proceed to notice them in succession as they occur.

* The most curious exportation, or the most curious use made of the article exported, we ever heard of, was this:—Our dealers in cast-off things or second-hand commodities (and Foote was wont to say that a coffin was the only thing that could not be bought and sold second-hand in England) were at a loss to know where to find a market for second-hand judges' and lawyers' wigs. A skipper engaged in the coast of Guinea trade thought that the negro chiefs might like them. He took out a few. Never did small speculation turn out better! The negroes were all mad for the wigs; and other shipments were soon made. Our informant saw a meeting of negroes, where every chief, naked in all save that and a clout round his waist, wore a flowing wig which had once done duty on some learned pate in Westminster Hall. For all that we know to the contrary, this trade with the negroes in cast-off wigs may still be going on in full force.

The first is to form a junction navigable for ships from the harbour of San Juan on the Caribbean Sea, through the lakes of Nicaragua and Leon (or Managua) with the port of Realejo in the Pacific. The river San Juan is the only channel by which the Lake of Nicaragua discharges its waters into the Atlantic. The Lake of Nicaragua is an inland sea, of a lengthened form, being about one hundred and twenty miles long, and forty broad where widest, without narrowing much at either end. Its circuit is near four hundred miles. It is deep enough to be navigated by vessels of considerable size, having at some distance from the shores from six to twenty fathoms of water along the southern and western banks, but is shallow along the north-east shore for a mile and upwards into the lake. The river issues from the south-eastern extremity, and near the fortress of San Carlos it is six hundred feet broad, and from six to seven deep. About the middle of its course the San Juan receives from the south the Rio San Carlos, and lower down the Serapiqui. About twenty-four or twenty-eight miles from its mouth the river divides into two arms, of which the southern and wider is called Rio Colorado; the other enters the sea near the harbour of San Juan de Nicaragua. The depth of water in the upper part of the course of the San Juan varies from nine to twenty feet, but in some places it is so shallow that rapids are produced. The greatest of these rapids is about twenty-eight miles from the lake. The lower portion of the river, below its bifurcation, is generally very shallow: at many places, during the dry season, there are not more than two feet of water. The port of San Juan is not considered very unhealthy, and the harbour is deep enough for merchant vessels, and safe; but up to the present time it is nearly uninhabited. The north-western mouth of the river, which is the only one that can be used, has a bar with only two or three, and seldom four feet of water upon it. Haefkins is of opinion that the cutting of a canal through the plain from the port of San Juan to the Lake of Nicaragua would be less expensive than to make the river navigable. He estimates the distance in a straight line at less than sixty miles. The winding course of the river amounts to one hundred and twenty miles. The difference of level between the lake and the Atlantic is one hundred and thirty-four feet, and therefore locks would be necessary. The narrowest portion of the isthmus which separates the lake from the Pacific is between the town of Nicaragua and the port San Juan del Sul, where it is only fifteen or sixteen miles across; but the hills upon it rise to between four hundred and five hundred feet. The hills might perhaps be avoided, but the canal would of course be longer. Some persons think that it would be more advantageous to unite the Lake of Managua (or Leon) by a canal with the harbour of Realejo. The country between them is nearly level, and of a firm soil, without being rocky. Besides this, the canal could terminate in the port of Realejo, one of the best harbours on the west coast of America, while that near Nicaragua would end in the harbour of San Juan del Sul, which is small and unsafe. But this canal would be more than twice as long as the other, and, in addition to this, the Tepitapa, which unites the Lake of Nicaragua with that of Managua, must be rendered navigable. The lake Managua (or Leon) is one hundred and fifty miles in circumference, thirty-five miles long, and fifteen broad in its widest part. It is deep enough for vessels of considerable size; but the Rio Tepitapa, which brings down the water from the Lake of Nicaragua, and is about twenty-five miles long, has falls, which in the dry season are from six to eight feet high, and also several shoals. These obstacles seem to have been produced by the lava which, in 1722, ran from the neighbouring volcano of Managua into the river, and it is supposed that they could be avoided by a canal cut through the level ground on the southern side of the Rio Tepitapa. There is even now a navigation between the town of Granada, on the banks of the Lake of Nicaragua, and the port of San Juan de Nicaragua, on the Atlantic. Flat-bottomed river-barges are used for the transport of goods, and accomplish their voyages in eight or ten days.

Another variation of this plan is to cut a canal of about fifteen miles from the south-western corner of the Lake of Nicaragua to the Gulf of Papagayo. The Hon. P. Campbell Scarlett wrote, in 1838, that the government of Central America were about to commence this work. It has, however, not been yet begun. Indeed the removing of the impediments to the navigation of the San Juan are far more serious labours than even the canal to the Pacific, whether formed from the Lake of Nicaragua or from that of Managua.

The next project is to form a communication from Chagres on the Atlantic, by the river of that name, joined by a short canal to the Rio Grande, which falls into the sea at Panama. Mr. Lloyd, in what he has written on the subject, does not speak of a canal, probably because in the then circumstances of the republic of Colombia it was an enterprise quite out of the question. His description of the country, however, shows that it may be considered next to impossible to make such a canal across the narrowest part of the isthmus, opposite the Bay of Mandingo. It appears that though there are no obstacles to the execution of such a work in the surface and soil which could not be overcome, the climate is so unhealthy, that the lives of many thousands would be sacrificed, and probably the mortality among the workmen would soon stop the progress of the work. Mr. Lloyd's plan for improving the communication was to begin at Limones, or Navy Bay, about five miles east of Chagres, which, though uninhabited, is an excellent harbour, and might easily be much improved. From this place he proposes a canal to be made to the banks of the river Chagres, which is only two miles and a half from the harbour; and as the intervening tract is a level, the canal could probably be made without locks. That river would then be ascended to its junction with the Trinidad river, and the latter to a place where its shores on the south bank are well suited for being converted into wharfs and landing-places, and thence finally to Panama or Chorrera by a railroad. The Hon. P. C. Scarlett sees reason, however, to conclude that a river and canal navigation sufficiently deep for steam-boats would not be so difficult to accomplish as Mr. Lloyd supposed, at least not from the physical character of the country, though the excessive unhealthiness of the climate, especially on the Atlantic side, and the total absence of a labouring population, would render an enterprise, which in England could be completed with the greatest facility, utterly impracticable in Panama. By the use of weirs or locks on the Chagres, and by deepening the Obispo and Mandingo, which fall into it in the upper part of its course, access could be obtained by a canal through a flat country, of not more than from five to seven miles in length to the navigable part of the Rio Grande. Mr. Scarlett also says, on the authority of the American consul, that a thousand labourers could be obtained at two dollars a week. The whole isthmus, a surface larger than Ireland, does not contain much above one hundred thousand inhabitants. We can hardly believe that in such a population a thousand labourers could be procured for a new, laborious, low-priced, and unhealthy employment. Another variation of this plan appeared in the 'New Zealand

Journal' of September 16, which proposes a canal of twenty-five miles to connect the Chagres and the Trinidada with the Farfan, which, according to the map there given, falls into the head of the Gulf of Panamá.

Another plan is "to connect Cupica Bay, in the Pacific, with a river flowing into the Atlantic, by forming a canal across the interval, which is ascertained to be a perfect level." This project is apparently that of Mr. Scarlett himself. It is to ascend the river Atrato, which falls into the head of the Gulf of Darien in the Bay of Candelaria, or Choco, to its junction with the Naipi, which is then to be connected by a canal of from twelve to fifteen miles to the Bay of Cupica, through a country perfectly level, rising but one hundred and fifty feet to the point of junction, running through a valley or gap of the Andes, the rivers themselves being uninterrupted by rapids or falls. The Atrato is stated to be five leagues wide at its mouth, and brings down a large body of water; its total length is about one hundred and fifty miles, but the Naipi joins it at about forty miles up its course. The Naipi is stated to be also a considerable stream, having twelve feet of water. The bays of Cupica and of Choco are both also said to be deep and well sheltered. The Atrato is also remarkable for having been already made the means of a communication between the two seas. The curate of Novita, in 1770, taking advantage of a natural ravine called the Quebreda de Raspadura, caused the Indians to dig a small canal, navigable by canoes during the rainy season, connecting the Atrato, by means of one of its most southern affluents, the Quito, with the San Juan, which falls into the Atlantic at a distance of two hundred and sixty miles from the mouth of the Atrato. This has been used for the conveyance of cocoa, and other agricultural products of the country, but is of no other use, and probably could not be made so. Mr. Scarlett's project, also, would no doubt be found extremely difficult from the excessive wetness and unhealthiness of the climate. Another and most serious impediment, to which we have not yet alluded, exists to the execution of any of these undertakings; it is—the unsettled state of all the old Spanish American States, and the consequent insecurity of all property, particularly that of foreigners. It is no part of our province to enter into political reasonings, but we think it clear that all such large improvements should be undertaken by a nation for itself. Done by an English company for the objects of English commerce, it would be a constant source of vexation to the natives if successful—a constant source of irritation to England if it failed. A recent number of the 'Journal des Débats' states that a commission has been just appointed by the French government, to examine into the project of a ship canal across the isthmus, and the names of the commissioners, Messrs. M. Lambert and M. Courtine. This may be so; and if skilful French engineers are employed to survey the country, a better knowledge of it may be obtained, and the best and most practicable line ascertained, but the obstacles arising from scarcity of labourers, unhealthiness of climate, and insecurity of property will still remain unremoved, till the country itself has advanced greatly in population and civilization, and then it would most probably undertake the task itself, or at most with some pecuniary assistance in the shape of shares.

Maternal Affection in Birds.—When the blue tit has taken possession of a hole in a wall, or in a decayed tree, she is not easily induced to quit it, but defends her nest and eggs with great courage and perseverance, puffing out her feathers, hissing like an angry kitten, and goes by the name of Billy-biter among the bird-nesting boys of several counties, from a vivid recollection of certain impressions made on their fingers. A female that had taken possession of a small wooden box, hung up against an outbuilding, into which she had carried abundance of materials for her nest, and in the midst of which she was then sitting upon her numerous eggs, allowed herself to be carried in the box into a house for examination; and when the box was replaced in its former situation, she did not desert her eggs, but hatched them, and reared her young.—*Yarrell's History of British Birds.*

Caricatures.—The caricaturist is one of the best of historical commentators. The striking peculiarities of the age, which are often but dimly seen in the pages of history, and carefully thrown into shadow in historical pictures, are always distinctly mirrored in the sketches of caricature, which has all the truth and vividness of a reflector, with permanence, instead of evanescence, in its forms and colours. It gives enduring shapes to the jests of the hour. It shows us the great men of a period as they were seen and laughed at by their contemporaries, and by enabling us to feel the emotions they inspired when alive, and enjoy the mirth their conduct or appearance suggested, lets us into the understanding of their characters, both more truly and more amusingly than biography. As one of the vehicles for the expression of opinion, caricature partakes of the nature of discussion, and in so far it is fraught with the advantages of discussion. This much we have thought it necessary to say in favour of this curious and neglected subject, though, to justify the attention we intend to bestow on it, we might have contented ourselves with observing that caricature is a department of art in which much talent and invention of a rich and remarkable kind have been displayed in portraying the manners and follies, the very spirit and features, of every stage and state of society.—*Westminster Review, No* 55.

Soda and Soap.—Soda has been used from time immemorial in the manufacture of soap and glass, two chemical productions which employ and keep in circulation an immense amount of capital. The quantity of soap consumed by a nation would be no inaccurate measure whereby to estimate its wealth and civilization. Of two countries, with an equal amount of population, the wealthiest and most highly civilized will consume the greatest weight of soap. This consumption does not subserve sensual gratification, nor depend upon fashion, but upon the feeling of the beauty, comfort, and welfare attendant upon cleanliness; and a regard to this feeling is coincident with wealth and civilization. The rich in the middle ages concealed a want of cleanliness in their clothes and persons under a profusion of costly scents and essences, whilst they were more luxurious in eating and drinking, in apparel and horses. With us a want of cleanliness is equivalent to insupportable misery and misfortune. Soap belongs to those manufactured products the money value of which continually disappears from circulation, and requires to be continually renewed. It is one of the few substances which are entirely consumed by use, leaving no product of any worth. Broken glass and bottles are by no means absolutely worthless; for rags we may purchase new cloth; but soap-water has no value whatever. It would be interesting to know accurately the amount of capital involved in the manufacture of soap: it is certainly as large as that employed in the coffee-trade, with this important difference as respects Germany, that it is entirely derived from our own soil. France formerly imported soda from Spain, Spanish soda being of the best quality, at an annual expenditure of twenty to thirty millions of francs. During the war with England, the price of soda, and consequently of soap and glass, rose continually; and all manufactures suffered in consequence. The present method of making soda from common salt was discovered by Le Blanc, at the end of the last century. It was a rich boon for France, and became of the highest importance during the wars of Napoleon. In a very short time it was manufactured to an extraordinary extent, especially at the seat of the soap-manufactories. Marseilles possessed for a time a monopoly of soda and soap. The policy of Napoleon deprived that city of the advantages derived from this great source of commerce, and thus excited the hostility of the population to his dynasty, which became favourable to the restoration of the Bourbons. A curious result of an improvement in a chemical manufacture. It was not long, however, in reaching England. In order to prepare the soda of commerce (which is the carbonate) from common salt, it is first converted into Glauber's salt (sulphate of soda). For this purpose, 80 pounds weight of concentrated sulphuric acid (oil of vitriol) are required to 100 pounds of common salt.—*Gardner's edition of Liebig's Familiar Letters on Chemistry.*



Edinburgh.]

A FIRST GLANCE AT EDINBURGH.

EDINBURGH, in respect to its topographical features, and without reference to the individual buildings it contains, is perhaps the most remarkable and picturesque city in the British Isles. Nay, there are not wanting writers who place it in the very foremost rank among the cities of the world for natural beauty; and certainly there is here a rare assemblage of most of the beauties which attract attention towards a city. We will endeavour to convey a slight idea of the general appearance of the city, so far as it depends on the undulating surface of its site.

There are four elevated spots, within or immediately contiguous to the town, from whence the eye can see the whole town mapped out beneath. These are the Castle Hill, the Calton Hill, Arthur's Seat, and Salisbury Crags; and these four will serve as points of reference by which the position of the town generally may be estimated. Arthur's Seat forms the most eastern boundary of the city, or rather south-eastern; and from its great height (822 feet) commands a most comprehensive view. At the very summit of this singularly-shaped hill is an isolated block of hard black rock (which probably forms the "seat" of some traditional Arthur); and while sitting on this rock, a visitor can well judge of the position of Edinburgh with respect to the sea. Looking northward, the eye glances over a range of green fields, sloping gracefully down towards the Firth of Forth; then to the Forth, with its steamers and shipping; and beyond to the hills of Fifeshire. To the north-west we look completely over Calton Hill towards a point of the shore higher up the Forth, near the piers at Newhaven and Granton; while between these two directions the eye rests upon the busy seaport of Leith. Directing the attention more westward, we find the entire city of Edinburgh, old and new, spread out before us; presenting at one point the bold rock on which the castle is situated; at another the antiquated and picturesque houses of the old town; at another the finely-situated Heriot's Hospital; and northward of these the magnificent ranges of new streets and squares which give to the New Town an appearance nowhere equalled in London except by Belgrave Square. Southward and eastward a most extensive range of open country comes under view; while in an intermediate direction Dalkeith Palace is just visible. Towards the west and south the near view is partially obstructed by a semicircular ridge called Salisbury Crags, rising to a height of five or six hundred feet, and separated from Arthur's Seat by a deep dell or valley. From the summit of these crags, and from an esplanade or walk at a lower level, another view is obtained, still more magnificent as regards Edinburgh itself, though not so comprehensive as to range.

When we descend from these two elevations, and walk north-westward towards the Calton Hill, we see that a flat low district separates the two; and we shall presently find this low valley a convenient place whence to commence a ramble through the city. Calton Hill rises to a height of three or four hundred feet, being about as much lower than Salisbury Crags as these are lower than Arthur's Seat. It forms the most favourite and admired promenade for the inhabitants of 'Auld Reekie;' being kept open and in good order for the use of all classes without limitation, and having in various parts of its gracefully rounded surface monuments erected to the memory of the good and great, such as Nelson, Playfair, Dugald Stewart, &c. The townsmen have attempted something more ambitious, in the form of a 'National Monument,' which was to be a kind of temple containing monuments of characters who had brought glory or benefit to the country, something on the principle of the Walhalla in Bavaria; but the plan was too gigantic: the means were not adequate to the idea; and twelve columns, supporting nothing, are all that exist to show what was intended—a sad memento of miscalculation. From the western slopes of this hill the topographical features of the city are more distinctly seen than from either of the former; and this has generally been deemed the most favourable point from whence to obtain a view both of the old and of the new town.

The meaning of these terms, 'old' and 'new' town, will be understood by glancing westward from the valley between Arthur's Seat and the Calton Hill. In this valley is situated Holyrood House, one of the easternmost buildings of Edinburgh, and the scene of many a momentous incident in the history of Scotland. Starting from this spot, and proceeding nearly in a westerly direction, we pass through a line of street as picturesque, perhaps, as any in Europe. This line comprises the Nether Bow, the Canongate, the High Street, the Lawnmarket, and the Castle Hill—names which will at once be familiar to the readers of Scott, as the locality of some of his most stirring scenes. The houses along this extended line of street are most remarkable: lofty, many-windowed, gable-fronted, and shaped and decorated with the utmost diversity of character. The dwellers in London have rarely an idea of the great height of these houses: seven, eight, and frequently nine stories or floors rise one above another, becoming generally more and more remarkable the higher they are situated. In Scotland these stories are called 'flats;' and in most cases each 'flat' comprises a distinct set of rooms, cut off from the general staircase by what may perhaps be termed an inner street-door; so that different families—each occupying one 'flat'—are nearly as much secluded from each other as if the separate flats formed distinct houses. In front of some of the houses may be seen, high up above the street, a board with the inscription "Two flats to let," or others of a similar kind. In many cases there is an external staircase from the street to the first floor (as we should term it in England), with a little oddly-shaped shop-window beneath or at one side of it.

This street, or line of street, ascends gradually the whole way from Holyrood House at one end to the Castle at the other; and thus it follows that the Castle itself occupies a lofty position. The Nether Bow is the lower portion of the street; then succeeds the Canongate, perhaps the finest part of the line; and at the Tron Church the High Street commences, terminated by the Lawnmarket, in or near which the once celebrated Tolbooth stood. On arriving at the Esplanade in front of the Castle, or, still better, on looking from the ramparts of the Castle, we see how remarkably this line of street is situated with respect to the surrounding streets. It is seen to occupy the ridge of a wedge-shaped hill, declining from the Castle to Holyrood House, and also declining on either side laterally; so that this central line of street is bordered on the north and south by a deep valley. Along the northern of these valleys runs a street of poorer houses, called 'North Back of Canongate,' and along the southern another equally poor range, called 'Cowgate,' and 'South Back of Canongate.' Innumerable lateral alleys or courts, called 'Wynds' and 'Closes,' branch out from the central line, and descend to these North and South 'Backs;' and it is in these 'Wynds' that the destitute, the desperate, and the profligate of Edinburgh (for every capital has a large number such) reside. Nothing to be met with in St. Giles's can exceed the filth and squalor of these places; yet so singular is their situation, that they do not offend the eye of a passer-by, unless he look somewhat closely; for the openings into these Wynds from the Canongate and High Street are seldom above three or four feet wide, while the Wynds themselves lie in the deep hollows or valleys to which we have alluded.

When we have passed to the western end of the Cowgate, the large area of the 'Grassmarket' begins; and from this the West Bow leads up a steep to the Lawnmarket, thus opening a connection between the central ridge and the southern valley. That portion of the city which lies south of the Cowgate is nearly on a level with the central Canongate, so that the Cowgate is really in a valley or ravine, and has narrow courts branching up to the north and south from it. This relative position has given rise to an arrangement which constitutes one among the many remarkable features of Edinburgh. As many of the public buildings are in and near the great central thoroughfare leading from Holyrood to the Castle; and as many others—such as the College, Heriot's Hospital, the Greyfriars' Church, Watson's Hospital, &c., are situated on the southern hill; it was long felt as an inconvenience that the approach from the former to the latter should be made by descending the narrow Wynds to the Cowgate, and thence ascending again. To obviate this, two very fine bridges or viaducts have been constructed, called 'South Bridge' and 'George IV.'s Bridge,' which span over the Cowgate at such a height that the roofs of six-storied houses in the Cowgate are seen far beneath the level of the roadway of these bridges. The view of this apparently-sunken street from one of the bridges is most singular: a narrow, close, dirty, pent-up street stretches onward beneath us at such a depth that we can scarcely conceive how intercourse was before maintained between it and the Canongate; and this is in itself sufficient to illustrate the great declivity of the Wynds which branch at right and left from these parallel lines of street. The rising ground southward of these bridges is not quite so high a level as the Canongate, but sufficiently so to give a most commanding effect to Heriot's Hospital and other buildings seen from the north. This southern portion of the city soon begins to exhibit new streets and houses, forming a kind of margin to the old city, and we at length come to the meadows which bound the city in this direction,—the bold fronts of Salisbury Crags and Arthur's Seat bounding the view on the east.

When we come to the western extremity of the central ridge, we find indications, fully as remarkable as those just noticed, of the inequality of the ground on which Edinburgh is built. Although we ascend gradually from Holyrood to the Castle, going westward, yet, when we arrive at the Castle, we find it bounded on the west, north, and south by a precipice almost perpendicular, descending three hundred feet to the level of streets beneath it. All this has a very strange appearance to a pedestrian; for although conscious that he is ascending a steep while walking from Holyrood to the Castle, yet he little expects to meet with such an abrupt and startling termination to his walk. There is an opening leading from the Lawnmarket, down an irregular slope to the low streets visible beneath the Castle; but as there are also handsome streets on a much higher level beyond this depression, another bold and very remarkable viaduct, called the 'New West Approach,' has been built, far above the level of a mass of small streets below, and yet far beneath the level of the hill on which the Castle stands; on one side we look up at the bare and rugged surface of the Castle-rock, soaring to a great elevation; on the other we look down upon about one-fourth of the city.

Transferring our attention now to the district northward of the central ridge, we find features fully as noteworthy in a topographical point of view. The Calton Hill is almost exactly northward of the Canongate, with the 'North Back of Canongate' occupying the line of valley between them; but westward of the Calton Hill there is no similar elevation, the general level being more nearly analogous to that of the Canongate. The 'New Town' of Edinburgh occupies a large area of ground northward of the 'Old Town,' and west and north-west of Calton Hill, but yet the Old Town is separated from the New in a manner

yet more marked than the southern suburbs. There is a deep but broad valley between the two, once called the North Loch, but now occupied partly by a market, partly by shambles, and partly by gardens and nursery-grounds. The descent from the New Town to this central vale is moderate, but from the Old Town it is very considerable. The vale is crossed by two modern erections, one called the North Bridge, in a line with the South Bridge which goes over Cowgate; and the other an immense mound of earth, which originated by forming a depository for dry rubbish, and accumulated till high enough to form a bridge or elevated path across the vale. From the North Bridge a descent of more than a hundred stone steps leads down to the level of the vale, where the busy operations of a large market are being carried on. To a person accustomed to see bridges only as media for crossing rivers or streams, it has a very singular appearance to observe thus, beneath the level of a lofty bridge, all the busy operations incident to the markets of a large city; and while looking westward from this bridge, with the lofty and antiquated houses of the High Street and Lawnmarket, terminated by the bold promontory of the Castle on the left hand, the fine streets and houses of the New Town on the right hand, and the vale between them,—we obtain one of those prospects which illustrate the wide difference between Edinburgh and almost all other towns in the kingdom.

Of the 'New Town,' which bounds the vale on the north, the greater part is formed of fine broad streets, intersecting each other at right angles, and containing handsome residences, many of which are built of stone. The streets have spread out gradually in this direction till they reach a small stream called the Water of Leith; and it is not until viewed either from the Calton Hill or the Castle Hill that the wide extent of these fine streets is appreciated. At one point on the Water of Leith is another instance of that which so frequently occurs in Edinburgh, viz., the crossing by a bridge, from one district of high land to another, over a deep valley; this is at Stockbridge, where a fine bridge crosses not only over the stream, but over a wide stretch of ground on either side of it; and a very beautiful view is hence obtained of a bend of the stream and its adjacent scenery.

The greater part of the New Town is occupied by private residences; but at the eastern end, near the Calton Hill, Princes Street, Waterloo Place, St. Andrew's Square, &c. contain many fine public buildings. Once again have we to allude to a viaduct; for Waterloo Place, a fine street in a line with Princes Street, is carried by very lofty arches over Low Calton and Leith Street, which are low and narrow parts of the Old Town, the roofs of whose houses are very far below the level of the roadway in Waterloo Place. This fine viaduct forms the medium of connection between the New Town and ranges of handsome houses which completely engirdle the Calton Hill near its base.

It will thus be seen that, without describing the buildings, the institutions, or the people of Edinburgh, there is yet in the topographical position of the city much which is very remarkable.

MARBLE PICTURES, AND ARTIFICIAL MARBLE.

THE French artists and artificers seem lately to have paid a good deal of attention to the use of *marble* in the arts, in respect to painting, engraving, encrusting, polishing, &c., and to the preparation of factitious marble. There is a French periodical devoted to useful subjects, under the title of 'Journaldes Connaissances Usuelles,' which has lately contained many articles on this subject; and it may not be uninteresting to notice here briefly a few of the details.

Marble in thin sheets is recommended as a substitute for the ivory tablets used by miniature painters. They vary in length from fifteen to twenty-seven centimetres, in width from twelve to twenty centimetres, and in thickness from five to nine millimetres (a centimetre being equal to about two-fifths of an English inch, and a millimetre to two-fiftieths of an inch). They may be made even thinner than this, but in that case they require to be supported on a thin back of wood or card board. The slabs are cut from a block of fine-grained marble, and the saw-marks are effaced by grinding with very fine sand; after which they are left in this smooth but unpolished state till wanted to be used, at which time they are polished, either with whetstone in fine powder, or with powder of calcined bones in water; whereby a highly beautiful polish is produced. The artist can give to the marble a higher or lower degree of polish, according to the effects which he wishes to produce, by varying the size of the grains of powder employed. The marble takes the colour better when polished only just before being painted.

The relative advantages of the two substances, ivory and marble, are thus stated:—Although ivory, when just cut and bleached, presents a delicate white, yet it more readily becomes tinged with yellow than good white marble. The light tints in ivory are liable to be changed in tone by any change in the whiteness of the ivory beneath. Ivory can be obtained only in slabs of small dimensions; whereas marble may be obtained of large size, provided means be adopted for strengthening the thin slabs. In hot climates, ivory slabs are exposed to the liability of scaling or peeling; an effect not produced on marble. Ivory is said to be a substance peculiarly liable to the deposition of dew, in a damp state of the atmosphere, whereby stains and discolorations are likely to result; an inconvenience from which marble is exempt. If a slab of ivory be broken, the task of mending it efficiently is almost impracticable; whereas marble slabs have been united, by a cement of lime and white of egg, so effectually as to conceal the joint.

The colours employed for painting on marble are the same as those for miniature painting on ivory, with the addition of a little ox-gall, used to fix the colours and to give a brilliancy of tint. Sometimes colours ground up with wax have been used instead of water-colours, the slab of marble being laid on a bed of hot sand, to give a temperature sufficient to melt the wax. Colours are also used diluted with essence of rosemary. As to the kind of marble employed, the white statuary marble, formed of an aggregation of crystalline grains, is not considered well suited for the purpose, on account of the reflexion of light from the little facettes of the granules. Marble of a more compact and homogeneous texture is preferred; that brought from the Greek islands being deemed most fitting.

Another mode of producing pictorial representations on marble is by a species of aquatint engraving, either in cavity or in relief. The slab of marble being prepared, it is covered with one or more coats of engraver's varnish. When the varnish is dry, the design is sketched on the surface; and the varnish is removed at those parts which correspond with the design. The sketch is then bordered with a little margin of wax; and into the receptacle thus formed is poured a mixture of equal parts of nitric acid and concentrated acetic acid. In a portion of time, more or less long according to circumstances, the acids have corroded the marble in those parts not protected by the varnish. The acid is then poured off, the wax removed, and the

varnish scraped off; after which the marble is polished to any required degree of lustre, leaving an engraving in cavity. By a reverse process, leaving the parts protected which produce the design, the picture would be in relief, like an engraved wood-block.

A third variety of picture or marble is a kind of incrustation or mosaic, combining both the engraving and the painting processes. The slab of marble being selected, the design is sketched on a piece of paper whose under surface is coated with black or red chalk; and this paper being laid on the marble, the design is transferred to the latter by following with a hard pressure all the lines of the design, by means of a suitable instrument. Then, with a hair-pencil, fluid wax is laid on the marble, not only on all the parts exterior to the picture, but in certain parts within the picture itself, as a means of guarding such parts from the action of acid. The marble is only partially polished before this process begins. The acid liquor is then applied to the marble, and allowed to remain till a certain amount of corrosion has been produced, generally to the depth of about one-fortieth of an inch. The acid is applied, drop by drop, from a kind of small cruet, so as to regulate its quantity according to the part of the picture under operation. A period of about three minutes is sufficient to produce the necessary degree of corrosion; and when this is effected, the acid is washed off and the wax removed. An engraving is thus produced, formed of a series of cavities separated by such lines as the wax had enabled the artist to produce; and these cavities are then painted with such colours as correspond to the design, the colours employed being the usual kinds, and the liquid in which they are mixed being either essence of turpentine, oil of gilliflower, fat-oil, or gum-water. The design being thus painted in every part, the colours are allowed to dry, and the marble is then coated with varnish so abundantly as to fill up the cavities, and bring all to the general level of the surface of the marble. The varnish employed is copal, and this is applied in successive coats to the coloured portions by brushes and pencils; each coating being allowed to dry, and being rubbed with polishing-powder, before the next is applied. About five or six coats of varnish bring the cavities to the required level; and the surface is then rubbed for a considerable time with a 'tampon,' or small cushion of linen or cotton covered with silk; the friction being hard at first, and then more gentle, till at length the whole surface presents one general glossy level, the varnish acting like a glass, through which the colours beneath may be seen. In some cases parts of the picture are gilt or silvered, by applying leaf gold or silver, much in the same way as for gilding on wood, a kind of gold-size being employed as the adhesive agent, and the whole being afterwards varnished in the same way as other parts of the picture. This art is called *Neozographie*.

Attention has been paid not only to these modes of painting and engraving on marble, but to the preparation of substitutes for marble, which shall serve either in the fine arts or in the mechanical arts. A factitious marble of this kind is one called *marmarillo*, and is thus described:—Any given quantity of quicklime being prepared, it is sprinkled with one-third of its weight of water, sufficient to make it fall in a white powder. It has been supposed that Vitruvius used these proportions between lime and water in the slaking; and hence Sage, a French writer on the subject, proposes to designate lime so slaked *Roman* lime. Four parts of this Roman lime are mixed with one part of water; and the paste thus made is thrown into moulds, whose form it accordingly takes, and in which it solidifies in about four or five hours. When taken out of the moulds, it hardens gradually, and in about five or six days it is susceptible of receiving a marble-like polish. A medallion of Henri Quatre has been produced in this way, the marmarillo appearing to have a compactness of grain about equal to that of alabaster. It has been suggested that if the water employed in making the paste were saturated with carbonic acid, it might probably render the marmarillo yet harder. A mixture analogous to stucco, and called *marmarillo crétacé* (chalky marmarillo), is thus prepared: three measures of pulverized chalk, two of Roman lime, and a sixth part of a measure of water, are worked up together into a paste, with which ornaments for architectural purposes may be moulded. A mortar of three parts chalk and three parts Roman lime, mixed to a proper consistence with water, is said to form an efficient coating for wood exposed to the action of water.

Another kind of factitious marble is described, differing considerably from that just noticed, and applied to somewhat different purposes. Broken fragments of marble, of glass, and of brick are taken; and after being pounded and sifted very fine, they are mixed together in the proportions of fifty of marble, fifteen of brick, and ten of glass. To these are added fifty parts of hydraulic lime, and the whole are worked up together with water into a paste or plaster. The plaster, on being applied with a trowel to any surface, hardens into a substance capable of being polished like marble; and in order to give the semblance of marble, means are adopted to impart both the ground colour and the colour of the veins, according to the kind of marble about to be imitated. For giving the ground colour the pigments are introduced into the paste itself, and harden with it. For giving the veins, the surface is painted with a pencil, in such forms and tints as correspond with those of the marble to be imitated. A little powdered Venice talc is put into a small linen bag, and sprinkled over the wet colour forming the veins; and this by gentle pressure is made to combine with the colour and with the groundwork. Great care is observed to exclude all *vegetable* colours, as their evanescent qualities would injure the durability of the production: the colours employed are mineral; and the ingredients of the paste are, before using, exposed to a heat sufficient to drive off any vegetable matters which may have combined with them.

Fallacy respecting Fallows.—Now, though a worn-out and tired *animal* requires rest, as well as nourishing food, to recruit his exhausted powers, this cannot be correctly said of the *earth*, which is perpetually reproducing, and only fails in yielding her productions from the exhaustion of those properties which constitute the food of plants, and which are only supplied, in an effective degree and quickly, by manures that contain the required principles. The earth, so far from taking advantage of any kind of rest which a farmer may be disposed to give it, *will* produce something—it will not rest—it will throw up a crop of weeds if left to its own energies; and, therefore, on the same principle that a parent will give his children some useful sources of occupation to prevent them from doing mischief, which he knows they will commit rather than be idle; or as he will cultivate their minds, and sow the seeds of useful knowledge, lest noxious weeds should spring up in their room,—so will the prudent farmer sow something that will produce a profitable return; he will imitate the practice of the gardener, who never dreams of letting his garden rest, because he knows that it will perpetually produce useful plants of one sort or other, and that if he does not cultivate some of them, a rank and luxuriant crop of weeds would be the spontaneous growth of the teeming earth.—*Guide to Service: The Farm Bailiff.*

A DAY AT THE HURLET ALUM-WORKS.



If the subject of this paper were designated 'A Day Underground," it would not inaptly express the main purpose in view, for the many miles of labyrinth whence the alum-ore is procured form by far the most striking and remarkable feature at the Works which are about to engage our notice. But we must somewhat enlarge the scope so as to follow the crude ore through its manufacturing history.

It will be well at once to anticipate the question, What is Alum? And to give an answer to it We know that, externally, alum presents the appearance of a whitish crystalline substance, but there is nothing to indicate to the eye that this substance is formed of the three singularly opposite ingredients—sulphuric acid, clay, and potash Yet such is the case, and we here have one of the many startling facts which chemistry presents. In chemical language, alum is a "sulphate of alumina and potash" (soda or ammonia being sometimes substituted for potash); the alumina is the basis or foundation for all varieties of clay, and derives its name from being an invariable ingredient in alum Dense and opaque as clay is known to be, even in its pure state of alumina, yet it contributes to the formation of the transparent alum so familiar to us

These, then, being the three ingredients, the next question naturally would be—Are they met with in a combined state, or do they require to be mixed artificially? Both are true, nay there are even four modes of union, for in some cases crystals of alum are found ready formed in the earth—in others, the three ingredients are met with in the same ore, but not combined into alum—in others, part only of the crude ingredients are found in the ore, and require the addition of the rest—and in others, the whole are combined by artificial means. The subject of alum-making becomes thus a somewhat complex one, but we may perhaps manage to obtain a few general ideas on the matter, without involving the niceties of chemical detail As respects native alum, it has been found in the form of crystalline needles in some part of the Andes of South America, in the form of a kind of crudy alum met with in another part of the same chain of mountains, in the form of long thin fibres having soda instead of potash, and occurring in a third district of the Andes, and in the form of a mineral called *aluminite* found in some parts of Germany In all these cases the ingredients are found combined into a state nearly analogous to alum. To go to the opposite extreme, we find that in France—and also at Newcastle—the alum is wholly an artificial product, formed by mixing clay, sulphuric acid, and potash, so as to lead to chemical combination

The intermediate modes of formation, that is, those which are in part natural and in part artificial, are of more extensive occurrence in Italy in Hungary, in Sweden, in Scotland, and in Yorkshire we find examples Various ores or earths, called *alum-stone*, *alum-slate*, *slate-clay* and *bituminous shale*, furnish the main material and these treated in various ways, yield the greater part of the alum of commerce For instance at Tolfa in Italy alum is made from alum-stone Nearly four centuries ago a Genoese merchant, who had seen alum-ore in Turkey, observed that at Tolfa trees were growing such as he had seen near the alum-pits in Turkey, and he thence conjectured that alum-ore might exist there His conjecture was correct and alum-works were soon established, which have existed ever since. The Tolfa alum-stone contains all the three ingredients, which, after the stone has been roasted, crumbled into powder, and boiled, combine and crystallize in the form of alum, without

the addition of any new ingredient. In Sweden the ore employed (containing a little potash) is alum-slate, which, besides roasting, requires the addition of other ingredients before alum can be formed.

In Yorkshire there are three alum-works. In Scotland there are four, two a little northward of Glasgow and two a little southward. The Yorkshire works, which are near Whitby, originated thus:—Sir Thomas Chaloner, who had an estate near Whitby in the time of Charles I., found alum-ore near the coast, and was desirous of working it; but as there was no one in England at that time who understood the art of making alum, he privately engaged men from Tolfa. The Tolfa works, being very profitable, had from the first belonged to the popes, who, like monopolists generally, tried hard to preserve the whole affair to themselves; the workmen who joined Chaloner were threatened with anathemas and excommunications, but all in vain, for the Whitby works soon became flourishing. Chaloner afterwards had a disagreement with Charles I. respecting the works; for the king, after granting him an exclusive patent, sold half the patent to another party, as a means of procuring money; and this is said to have led ultimately to the active part which Chaloner took against the king in parliament. The Whitby district, where these works are established, is a remarkable one. It consists of precipitous cliffs containing alum-slate, bordering on the sea, and stretching to a distance of about thirty miles along the coast of the German Ocean. The alum-slate is covered with ironstone, sandstone, alluvial soil, and a few other matters; and when these are removed, the rock is broken piecemeal by picks and javelins, roasted, evaporated, and otherwise treated so as to yield alum.

These few details concerning alum and alum-works in other countries will enable us to understand better what meets the eye at the Hurlet works. There is a firm at Glasgow to whom three out of the four Scotch alum-works belong; viz. two near Campsie, and one near Hurlet. Either one of these will suffice to show the general character of all; and through the kindness of the proprietors we are enabled to describe the last named of the three. When the British Association met at Glasgow, in 1840, Dr. Thomson briefly alluded to these works; but rather in reference to the chemical character of the produce than to the arrangement of the works. The Campsie works are situated among the Campsie Hills, a few miles north of Glasgow; while the Hurlet works are a few miles south of Glasgow; both are situated in a partially-exhausted coal district, for reasons which will presently appear.

A pleasant ride of half a dozen miles from Glasgow, or a railway trip to Paisley as part of the distance, brings us to an open part of the country whose green fields give but little indication of the burrowing which has gone on beneath them. On arriving near the village of Hurlet, however, there are here and there streams of smoke visible, which point out the localities of certain alum, iron, and lime-works; and these indicate that the mineral riches beneath are not confined to one kind alone. The country around is undulated with gentle hills and hollows; but still there is a grassy covering which effectually conceals these underlying beds. It is not till we enter the precincts of any of the works that we find the pits which open up a communication between the world above and the world below; and even there we see little from whence a judgment might be formed of the honeycombed condition of the ground beneath: we must grope, in *propriâ personâ*, through miles of shallow, dark, arched passages, regardless alike of water, mud, coal, and alum, before we can rightly understand the "whereabouts" of the mines.

When we get within the boundary of the alum-works, we find an extensive area of ground, occupied in part by buildings where the preparation is conducted, in part by open pits where the ore is steeped, and in part by huge heaps of earthy matter either still burning or lying useless after being burned. It is one consequence of the condition in which the ingredients for alum are found in the ore that a large mass of earthy refuse is separated as an incumbrance; and this refuse is accumulated in enormous ridges and hillocks, until taken away to be used (we believe) for footpaths or in the formation of railroads. There is no large factory, no many-storied building with its various rooms filled with workmen; the buildings being only such as are necessary to enclose the furnaces, the boilers, the tanks, the coolers, and the other vessels required in the process; together with the water-wheels which raise the ore from the pit, and pump liquid from one vessel to another.

In such districts as this, the possession of a mine by no means implies the possession of the ground above it; the two are held by different tenures, and are leased, or may be leased, independently of each other. Nay, not only so; but if the mineral strata beneath comprise more than one kind, each kind may be leased separately, and to a different person from those who lease the rest. Something of this kind occurs at Hurlet. The property is owned by the Earl of Glasgow and other parties, and the surface ground is leased off in the usual way; but as there are four kinds of mineral produce beneath—coal, iron, lime, and alum—the lessee of the surface ground has, as such, no interest in these sources of wealth: other leases are granted, according to the kind of mineral which is to be worked; and thus there may be four or five leases, and as many lessees, co-acting at the same time in one place. For instance, the Hurlet Alum Company rent all the alum found throughout a certain extent of country, but have nothing to do with the iron, the coal, or the lime found in the same pits which yield the alum, these ores being leased to other parties. It thus arises that there may be, and are, different sets of miners at work at one time in the same series of labyrinthine passages, some to collect one kind of material and some another; each party independent of the others, in respect to the contract with the employers, the mode and rate of payment, the kind of tools employed, and the general mode of procedure. This explanation will enable us better to understand what meets the observation when down in the pits.

The alum-ore is drawn up to the surface near the buildings where the subsequent processes are conducted; but the men descend to the mine at the distance of half a mile from that spot, the same shaft serving for the various classes of miners. This shaft is in the middle of a field, and presents to view nothing more than a square opening measuring about six feet each way, guarded by slight wooden palings at the margin, and having ladders of very small steps for the descent. The depth is not very great—insignificant, indeed, when compared with that of the mines whence metallic ores are procured; and hence the descent has nothing about it very fatiguing. But once arrived at the bottom, we are just as much excluded from the light of day and are exposed to the same rough usage as if we were ten times as far beneath the surface. An old coat and cap, a thick pair of boots, a little lamp, and a little courage must prepare us for our groping excursion; and we soon find that not one of these can well be spared.

When we follow our guide from the bottom of the descent into the passages of the mine, the profound darkness has at first a very bewildering effect; for the earthy lining of the passages is so nearly black that it

reflects very little of the light from the small lamps carried in the hand, and thus the lamps seem like so many specks of light set in—nothing. Under foot the soil is rather wet and sloppy, and over head the roof is so low, that a stooping posture is unavoidable. By degrees the eye becomes accustomed to the peculiar gloom of the place; the lamps, which at first only rendered the "darkness visible," now throw a faint glimmer upon a few prominent points, from which we find that we are walking through a low arched passage.

On the occasion when we groped through this mine, we accompanied two of the managers, one of whom had cognizance of and superintendence over the operations for the collection of alum, while the other superintended the coal and lime miners; and we thus had an opportunity of seeing most of the operations going on. After having walked 'in single file' for some considerable distance, we came to a spot where a number of glimmering lights showed that mining operations were being carried on. Some men were seated about on heaps of coal, nearly shrouded in darkness; while others, with bits of lighted candle stuck in their caps, were digging and shovelling coal. One man was preparing a blast; that is, he was placing gunpowder in a cleft of solid coal-rock as a means of riving it. When his operations were completed, all the men retired to a respectful distance, there to remain till the explosion was over; and this interval of a few minutes, though mere matter of course to the miners themselves, is suggestive of some awkward thoughts to those who are new to the subject; for an indefinite expectation of some mischief, which we can neither measure nor guard against, is very apt to arise. However, in the course of a few minutes the fuse was kindled, and the gunpowder exploded; and it was then to be seen that a large mass of coal had been loosened from its bed, upon which the miners immediately set to work.

Having left this spot, we continued our groping through a long series of arched passages; some wet underneath, some dry; some having a railway on the floor for drawing up the 'corves' or baskets of coal from a lower level; some high enough to permit walking in an erect posture, others (and these the greater part) so low as to render a painful stooping posture indispensable; some several feet wide, others wide enough only for one person to pass at a time. These passages branched out from one another at all angles and in all directions, till no one but a practised person could form the least conception of the course we were taking, whether away from or round again towards the entrance. For the most part these passages were deserted coal strata; all the coal having, in the course of years, been removed, except certain portions which were left as pillars to support the roof; and as the stratum of coal thus removed declined at a certain angle in one direction, the void passage acquired the same slope, and thus the transit through the mine is an incline, upward or downward according to the direction.

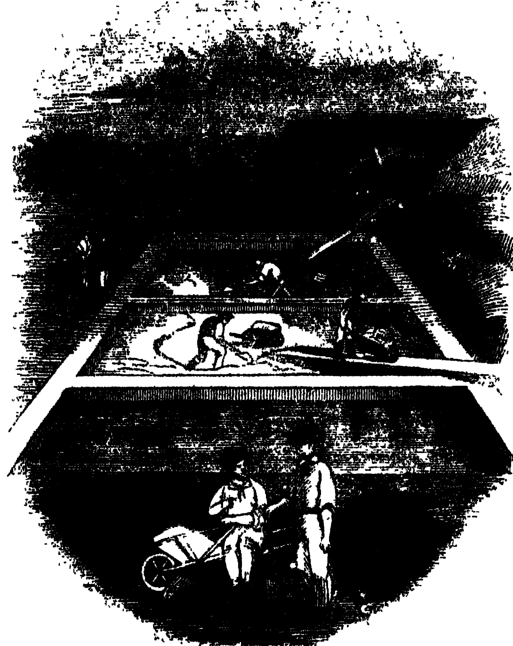
At one part of the mine we came to a spot where a party of lime-miners were at work. The lime was in the form of very hard stone, and the removal of it was severe labour. The number of lights being considerable, and the white stone affording a good reflecting surface, this part of the mine was more visible than any other. The men had the upper part of the body naked, with the exception of the cap which held the bit of lighted candle; and some, in the intervals of work, were seated on low heaps of stone or rubbish, smoking their short pipes. As to their conversation, it was very little more to be understood by a stranger than Gaelic would have been; for the miners' language is full of words not in use elsewhere, or else differently applied. For instance, in the lead-mines of Derbyshire, a 'coffin' is an old working open to the day; a 'country' is a rock through which a vein traverses; and 'trade' is the rubbish or refuse from a mine: again, in Cornwall a 'trouble' is a break in the continuity of a vein; an 'old man' is a place worked in former ages; and so forth—many of the terms and phrases being common to all miners, while others are peculiar to certain localities. Another group of miners, warming some oatmeal 'parritch' over a small fire, and enveloped in the smoke, formed a curious patch in the dusky landscape.

While walking along the arched passages, if the hand were passed over the surface of the roof, or if the head—from a want of proper humility—struck against it, we could easily see that the roof was coated with a crumbling powdery substance, easily scraped from the solid rock. This was a decomposed state of the mineral which was afterwards to yield not only alum, but also copperas; the air and damp of the mines having in the course of years brought to an efflorescent state that which would otherwise have been a hard stony substance. In other parts of the vaulted passages specimens might occasionally be picked up, in which a hard slaty substance was interstratified with layers of a greenish-white crystalline body; while in others again a brownish-black kind of coaly-slate was the form in which the alum-ore presented itself, always occurring *above* where the coal had been, and never below it. At another place, being the lowest part of the mine, an area of several acres of water had collected, entirely occupying the deserted workings at that part. This water, when tasted, was found to be strongly impregnated with the two salts—copperas and alum—resulting from the decomposition of the alum-ore which had dropped into the water, or over which the water had trickled.

After groping in this way for three hours, to a distance of four or five miles through the apparently interminable passages of the mine—some of which belonged to one proprietor, some to another, but all leased (in respect to the alum) to one party—we returned to the entrance; not unwilling to exchange a stooping attitude and a dim glimmer for free movement and the light of day.

Let us next see the processes to which the alum-ore is subjected. In these mines there was originally a stratum of coal, with a stratum of lime above it, and between the two a thin stratum (varying from two to twelve inches in thickness) of ore containing most of the chemical elements for alum. So long as the coal was not worked, the alum probably remained undiscovered, or at least unworked; but when the whole stratum of coal was removed, the slaty stratum above it was laid bare. In this slaty stratum there are, among other elements, sulphur, alumina, and iron; and these, by the long-continued action of air and moisture, lead to the formation of sulphate of alumina and sulphate of iron. But heat will also lead to this transformation; and thus the operations of the alum-works involve two varieties, one for the efflorescent ore, and the other for the stony ore.

Supposing the crumbled ore (which has a greyish colour and a salt taste) to be scraped and collected from the pit, it is put into large open depositories called *steeps*, freely exposed to the air. It is there covered with water partially impregnated with sulphate of iron and alumina, and allowed to remain undisturbed for several hours, during which time the sulphates become dissolved in the water, and the earthy residue subsides. The water, having imbibed the saline matter from the ore, is drawn off to a settling-cistern, and the half-spent ore is steeped again and again with fresh water, until all the soluble matter is completely exhausted.



[Steeping-Pits.]

In the cistern the earthy sediment wholly separates, and from thence the liquor is pumped into a series of long arched boilers, so formed as to apply heat to the



[Evaporating Boiler.]

surface of the liquid. By this means a considerable portion of the water is evaporated, and the highly concentrated liquor is then transferred to large coolers, where it remains about a fortnight undisturbed. During this interval a process of crystallization goes on: the liquor contains sulphate of iron (copperas) and sulphate of alumina, and the former of these separates from the latter by gradually crystallizing. Sticks called 'riders' are immersed in the liquid in the coolers, and around these sticks large bundles of beautiful green crystals collect, forming the well-known but absurdly-named 'copperas' of the shops.

When the crystals of copperas have been removed, the remaining liquor is drawn off into an evaporating boiler, in order that the sulphate of alumina may go through the same process as the copperas; and, after boiling to a certain strength, the liquor is drawn off into a cooler. Sulphate of alumina will not crystallize



[Crystallizing Coolers.]

without the addition of potash or some other alkali, and potash is therefore put into the cooler with the liquid, by which, after some days' standing, crystals of alum are produced, those crystals being a sulphate of alumina and potash. After this follow other processes of boiling, evaporating, and crystallizing, for the purpose of purifying the alum—processes which give rise to the distinctions of 'green alum,' 'white alum,' and 'finished alum;' but into these details we need not enter.

When, instead of the efflorescent or powdery ore, the hard or stony ore is used, a preparatory process is necessary. This ore (which in appearance is somewhat midway between slate and stone-coal) contains sulphur, iron, and alumina, like the decomposed ore; but these three elements have not yet been combined into the sulphates of iron and of alumina; and the aid of fire is necessary for this transformation. The ore, after being broken into small pieces, is built up into long ridges, with fuel beneath and air-holes in different parts; and here it is burned as a preparative process.

It will thus be seen that the copperas is an extra prize which the alum-maker obtains from the ore, when the latter has been decomposed by the air; and that the four main processes, varied somewhat in detail, are roasting, steeping, boiling, and crystallizing; and the alum thus made is forthwith ready for use in dyeing, in tanning, and numerous other branches of manufacture.



SIR ROGER DE COVERLEY.—No. IX.

When Addison has got Sir Roger fairly in London, he will not trust him to inferior hands. The 'Spectator,' No. 329, is a genuine morsel of quiet humour. The idea of the good old country squire displaying his historical knowledge, upon the strength of Baker's Chronicle, is highly amusing. Nothing can be happier than his wonder that he did not find the history of the wax-work maid of honour in the State Annals of Queen Elizabeth.

"My friend Sir Roger de Coverley told me t' other night, that he had been reading my paper upon Westminster Abbey, in which, says he, there are a great many ingenious fancies. He told me at the same time, that he observed I had promised another paper upon the tombs, and that he should be glad to go and see them with me, not having visited them since he had read history. I could not imagine at first how this came into the knight's head, till I recollected that he had been busy all last summer upon Baker's Chronicle, which he has quoted several times in his disputes with Sir Andrew Freeport since his last coming to town. Accordingly I promised to call upon him the next morning, that we might go together to the abbey. . . . As we went up the body of the church, the knight pointed at the trophies upon one of the new monuments, and cried out, 'A brave man, I warrant him!' Passing afterward by Sir Cloudesley Shovel, he flung his hand that way, and cried, 'Sir Cloudesley Shovel! a very gallant man.' As we stood before Busby's tomb, the knight uttered himself again after the same manner: 'Dr. Busby! a great man! he whipped my grandfather; a very great man! I should have gone to him myself, if I had not been a blockhead: a very great man!'

"We were immediately conducted into the little chapel on the right hand. Sir Roger, planting himself at our historian's elbow, was very attentive to every-thing he said, particularly to the account he gave us of the lord who had cut off the King of Morocco's head. Among several other figures, he was very well pleased

to see the statesman Cecil upon his knees; and concluding them all to be great men, was conducted to the figure which represents that martyr to good housewifery who died by the prick of a needle. Upon our interpreter's telling us that she was maid of honour to Queen Elizabeth, the knight was very inquisitive into her name and family; and after having regarded her finger for some time, 'I wonder,' says he, 'that Sir Richard Baker has said nothing of her in his Chronicle.'

"We were then conveyed to the two coronation chairs, where my old friend, after having heard that the stone under the most ancient of them, which was brought from Scotland, was called Jacob's pillar, sat himself down in the chair, and, looking like the figure of an old Gothic king, asked our interpreter what authority they had to say that Jacob had ever been in Scotland. The fellow, instead of returning him an answer, told him, that he hoped his honour would pay his forfeit. I could observe Sir Roger a little ruffled upon being thus trepanned; but our guide not insisting upon his demand, the knight soon recovered his good humour, and whispered in my ear, that if Will Wimble were with us, and saw those chairs, it would go hard but he would get a tobacco-stopper out of one or t' other of them.

"Sir Roger in the next place laid his hand upon Edward III.'s sword, and, leaning upon the pommel of it, gave us the whole history of the Black Prince, concluding that in Sir Richard Baker's opinion Edward III. was one of the greatest princes that ever sat upon the English throne.

"We were then shown Edward the Confessor's tomb; upon which Sir Roger acquainted us that he was the first who touched for the evil: and afterward Henry IV.'s, upon which he shook his head, and told us there was fine reading in the casualties of that reign.

"Our conductor then pointed to that monument where there is the figure of one of our English kings without a head; and upon giving us to know that the head, which was of beaten silver, had been stolen away several years since—'Some Whig, I'll warrant you,' says Sir Roger: 'you ought to lock up your kings better; they will carry off the body too, if you don't take care.'

'The glorious names of Henry V. and Queen Elizabeth gave the knight great opportunities of shining, and of doing justice to Sir Richard Baker, who, as our knight observed with some surprise, had a great many kings in him, whose monuments he had not seen in the abbey.

"For my own part, I could not but be pleased to see the knight show such an honest passion for the glory of his country, and such a respectful gratitude to the memory of its princes.

"I must not omit that the benevolence of my good old friend, which flows out towards every one he converses with, made him very kind to our interpreter, whom he looked upon as an extraordinary man, for which reason he shook him by the hand at parting, telling him that he should be very glad to see him at his lodgings in Norfolk-buildings, and talk over these matters with him more at leisure."

THE LABOUR-ECONOMY OF MINING.

The labour-economy of mines, if such a term may be permitted, that is, the relation existing between the employer and the employed, is very different in different countries; but in most cases it has something about it remarkable and interesting. In the coal and iron districts of England the miners are employed at so much per day, or so much per given measure of ore produced; and in so far the system is analogous to other branches of labour. But in Cornwall a peculiar arrangement is observed, which we shall be better able to understand by contrasting it with the systems pursued in Saxony and in Hungary.

Mr. J. Taylor, the eminent mining-engineer, in a lecture which he gave before the Society of Arts a few years ago, and of which an abstract was afterwards published in the 'Mining Review,' gave the following account of the Saxony miners. The mines are state property, and are rich in silver, tin, lead, iron, and other metallic ores. The persons engaged are marshalled with almost the rigour of an army; the officers are brought up and instructed for the purpose, having regular commissions, and each his appropriate rank; the men being directed by them, and the work of each one allotted. At Freiberg a 'Mining College' affords the means of study in every department connected with the subject, not only to the natives of Saxony, but to all foreigners who wish to avail themselves of its advantages. The supreme direction is intrusted to an individual who has the title of *Oberbergamtmann*, and who is generally a nobleman of distinction. He is assisted by a council called the *Bergamt*, to which all subjects of management are referred. This council consists of a certain number of the principal officers, each of whom has his separate duties in the administration. The mining corps is divided into three bodies, the first being the *miners*, the second the *smelters*, and the third the *foresters*, who attend to the supply of timber and fuel to the mines and reduction-works. These three classes wear different uniforms, and there is a very minute subdivision of duties. Thus, in the mining department there are officers superintending the underground works with various degrees of rank; others who manage the machinery; and others again who direct the working of the ores, and the preparing them for the smelting-houses. Upon every operation which may seem to require deliberation, these officers have to report to the Bergamt, or council, and are generally expected to prepare long written descriptions of the matter to be discussed, and which are called 'Acts.' The labouring miners are marshalled into detachments, who relieve each other at regular times, and each man is expected to perform a certain portion of labour allotted by the underground officers under the control of the council.

Although this system appears beautiful from its order and strictness, yet Mr. Taylor enumerates many disadvantages attending it. The number of officers is so great as to entail a very heavy expense in relation to the value of the produce of the mines. Another defect is, that the deliberations of the Bergamt are often protracted to such an inconvenient length that fit opportunities for action are lost, and all the inconveniencies of divided opinion are increased. Another point is, that the responsibility is so divided that it almost ceases to be an active principle. Furthermore, the allotment of a certain amount or task of labour to each man limits the active exertions of the most industrious; while the want of the vivifying principle of self-interest throws a sluggishness over the whole.

In Hungary, where the mines in like manner belong to the crown, they are divided into four districts, each district having its government and its separate establishment of smelting-houses: but all send their produce to Kremnitz to have the gold and silver separated from the ore and the crude metal coined. The School of Mining contains about two hundred students, who receive their education free of cost, and in some cases are assisted by an annual donation. There are five professors, who deliver lectures on chemistry, metallurgy, mineralogy, mining, mathematics, surveying, and drawing. The course of study lasts three years, besides two years' practice in the mines; after which an examination must be passed in public before

a certificate can be obtained. The students wear a neat uniform of dark green cloth turned up with red; the jacket has padded sleeves from the shoulder to the elbow, to protect the arms from the sides of the mines; and behind is a large piece of leather, something like the tails of a coat, strapped round the waist. It is from among these students that the government mining officers are selected. All the government Hungarian mines are under a chief, assisted by a council, and each district has besides this its own *Bergamt*, or council, composed of the chief mining officers. The number of petty officers is immense, so that the individual responsibility is very small indeed. The working miners are about twenty thousand in number: they each work about eight hours a day; and as, by a very absurd regulation, they are not allowed to earn more than a sum equal to about three shillings per week English, they have acquired a habit of peculation, which the officers find great difficulty in checking; and indeed the officers themselves are paid so badly that they are more likely to yield to temptation than in other parts of Europe. The whole of this system is so badly managed, that, while officers and men are miserably paid, the government is said to gain hardly anything by the mines.

Let us contrast these two systems with the admirable one pursued by the tin-miners of Cornwall. The mines are worked at the risk of private individuals, who are generally associated in companies supported by joint-stock contributions. They hold the mines by leases granted by the landowner for certain terms; and the mode of working is regulated by covenants suited to the circumstances. The dues or rents are usually a portion of the produce, or of its value in money. The Company, who are the lessees, and who work the mine, are called the *adventurers*, while the owners of the soil are termed the *lords*. The whole management of the mine is vested in the adventurers. As each set of adventurers are at liberty to adopt such mode of management as to them may appear most fitting, so there is rather a general coincidence than an absolute uniformity of practice. The most important class of officers, to whom the practical direction is intrusted, are called *captains*, and are generally selected from the most intelligent workmen. Their duties in large concerns are divided, and a difference of rank is kept up: but the principle of responsibility is never lost sight of, and they are stimulated by the prospect of advancement which is often afforded to them. One captain of the greatest experience usually governs the others, and, with the aid and advice of one of the partners, or of some person appointed as the principal manager, attends to all the business of the concern; while the departments of accounts, of the construction and care of engines, of the purchase of the several articles used, of the ore-dressing, &c., are superintended by persons appointed by the manager and principal captain. These captains of mines have generally a great weight of responsibility on them, and are in most cases intelligent and trustworthy men, well fitted to offer advice as to the best modes of conducting the extensive operations incident to mining.

Thus much in respect to the owners, lessees, and superintendents of the mines. Now we come to the actual workers; and the arrangements connected with them we shall state nearly in the words of Mr. Babbage. In the Cornish mines almost the whole of the operations both above and below ground are contracted for in the following manner:—At the end of every two months the work which it is proposed to carry on during the next period is marked out. It is of three kinds, *tutwork*, *tribute*, and *dressing*. *Tutwork* consists in sinking shafts, driving levels, and making excavations: this is paid for by the fathom, in depth or in length, or by the cubic fathom, and is, therefore, like ordinary labour. *Tribute* is payment for raising and dressing the ore, by means of a certain part of its value when merchantable; and this is the peculiar part of the system which gives such interest to the Cornish mining operations; for the miners, who are to be paid in proportion to the richness of the vein and the quantity of metal actually extracted from it, naturally become quicksighted in the discovery of the ore and in estimating its value; and it is their interest to avail themselves of every improvement that can bring it more cheaply to market. *Dressing* is performed by other workmen. The tributers, who dig and dress the ore, can seldom afford to dress the coarser parts of that which they raise at their contract price; they, therefore, leave it, and this portion is again let out to persons who agree to dress it at an advanced price. The lots of ore to be dressed, and the works to be carried on, having been marked out for some days, and having been examined by the men, a kind of auction is held by the captains of the mine, in which each lot is put up and bid for by different gangs of men. The work is then offered, at a price usually below that bid at the auction, to the *lowest* bidder,—that is, to the person who will consent to take the smallest share as his remuneration for raising and dressing the whole; and this lowest bidder rarely declines it at the rate proposed. The tribute is estimated on twenty shillings worth of produce, and varies through the wide interval from three pence to fifteen shillings, according to the richness of the ore and the ease of working. The rate of earnings in tribute is very uncertain: if a vein, which was poor when taken, becomes rich, the tributers earn money rapidly; and instances have occurred in which each miner of a gang has earned a hundred pounds in the two months. These extraordinary cases are, perhaps, of more advantage to the owners of the mine than even to the men; for whilst the skill and industry of the workmen are greatly stimulated, the owner himself always derives greater advantage from the improvement of the vein.

Mr. Taylor gives a few further particulars on this subject. So efficacious is the tribute system, that it has been doubted whether many of the deep mines of Cornwall could be worked at all except on this system, so great are the difficulties sometimes met with, and so great the energy and stimulus which this healthy competition gives. Each gang or partnership consists of from two to twelve persons. The men pay for every article they use in their work, such as tools, gunpowder, and candles; and they pay at certain rates for the use of the machines that raise the ore to the surface, and the wages of all persons employed in washing and preparing the ores for sale. The mine-owners, therefore, by their capital and the skill of their agents, discover the ore, form the approaches, drain off the water, and ventilate the workings; and then the tributers come in to search out the metallic veins wherever they may exist, and to devise the best modes of producing the greatest quantity of metal in the shortest time. The payments which these men make, cause them to look with a careful eye on all cost incurred by others through whose hands the ores may pass, and thus to tend to a general economy; and the combined keenness and caution to which the system gives rise, are well calculated to lead to discoveries favourable to the interests of the men.

Mr. Taylor has introduced this Cornish system into Flintshire, Cardiganshire, Yorkshire, Cumberland, and Ireland; and although he had to contend with many difficulties at first, the advantages of the arrangement soon became evident to the men, who did not afterwards wish to retrograde to the old system. Mr. Taylor thus characterises the general effect of the

Cornish system :—"The rate of wages regulates itself by the circumstances that ought to control it—the demand for labour. No one has heard of disagreements between the Cornish miners and their employers —no combinations or unions on the one side or the other exist; nor have 'turn-outs' or 'strikes' been contemplated or attempted. This plan works with perfect harmony and facility, whether as applied to tutwork or tribute; a great number of men are contracted with in a remarkably short space of time; the judgment of the agents as to the proper prices to be given is checked, and perhaps corrected by the knowledge of the men; all jealousy as to favouritism is avoided, and an evil consequence which might be supposed to follow, namely, heart-burnings among the men who compete with each other, is not at all found to exist."

Mr. Babbage, too, thus favourably alludes to the system :—"It would be of great importance if in every large establishment the modes of paying the different persons employed could be so arranged, that each should derive advantage from the success of the whole, and that the profits of the individuals should advance as the factory itself produced profits, without the necessity of making any change in the wages agreed upon. This it is by no means easy to effect, particularly among that class whose daily labour procures for them their daily meal. The system which has long been pursued in working the Cornish mines, although not exactly fulfilling these conditions, yet possesses advantages which make it worthy of attention, as having considerably approached towards them, and as tending to render fully effective the faculties of all engaged in it."

The Condor.—This vulture of the Andes is much more remarkable for his audacity, the enormous strength of his beak, his wings, and his talons, than for his dimensions from point to point of the wings, which only stretch on an average from 8 to 9 feet, which are the usual dimensions of the Lammergeyer or Swiss Vulture. Many persons, of the highest credit, in Quito and the Andes, assured Baron Humboldt that they never killed any that exceeded eleven feet from one wing to the other. It has been said that there was a stuffed one formerly in the Lever Museum in London that was 14 feet, but if true it must have been a great exception. The Irish giant O'Brien, whose skeleton is in the Surgeons' Museum, was 8 feet high, though the Irish in general are no bigger than Englishmen. It is the great strength of the condor that has given rise to the fabulous stories of immense wings. The beak and talons of the condor are certainly of the most enormous force. It is very common to see them attack a young bull and tear out his tongue and eyes. Two condors will dart upon the deer of the Andes, upon the puma and the vicuña. They will even attack a heifer; they pursue it for a long time, wounding it with their beak and talons, until the animal, breathless and overwhelmed with fatigue, thrusts out its tongue, bellowing. The condor then seizes the tongue, a morsel to which it is much attached, then tears out the eyes, &c. In the province of Quito, the mischief done to cattle, but more especially to sheep and cows, by this formidable bird, is immense. Sometimes the natives observe him when he is so gorged that he cannot fly, and then dispatch him. Because vultures feed generally upon dead or putrid meat, Humboldt and others always say that the *scent* must be very acute which enables them to swoop down so to the particular spot, and from such heights that they appeared before mere specks in the sky; but is sight more wonderful than scent? and if not, then sight is the more probable of the two, because the bird is above the earth at a great height, and because we know that the eagle never takes any but living victims, and will not eat putrid meat in confinement if ever so hungry: and if the eagle has a telescopic eye, why not other birds? In India, vultures are often seen descending upon the carcasses of piously self-drowned Hindoos floating down the Ganges; and one traveller mentions that they came from all points of the compass to a newly-killed animal, and that during a regular trade-wind. Audubon, the American ornithologist, mentions several experiments, the result of which are conclusive upon this subject. The first was by stuffing a dried deer-skin and laying it on its back in the field so as to represent a dead animal, which brought all the vultures in the neighbourhood to it directly; they seemed puzzled about the glass eyes not being eatable, and looked quite nonplussed when, instead of guts, they could pull out nothing but the dried grass of the stuffing. The second experiment was to lay a putrid pig in a ravine completely covered up with grass and leaves; and vultures, buzzards, and carrion crows sailed over it repeatedly, and never once found it out, though dogs did. The third experiment was, "I stuck a young pig and left the blood in sight, and took it bleeding on the track to a place where I hid the pig entirely with grass and leaves. The vultures soon saw the pool of blood, and following the track, devoured the pig in my sight." The experiments of Darwin are equally conclusive on this subject.

Ostrich.—The most singular circumstance in the history of the Ostrich is, that the male bird sits on the eggs. The female lays a great number of them, but always at an interval of three days each, which, in a warm climate, would, of course, cause all the early laid ones to be addled. The females, therefore, associate together and fill one nest with eggs to the amount, generally, of about twenty-two in each nest. "The Gauchos (the half-wild countrymen of South America) affirm, and there is no reason to doubt their statement, that the male bird alone hatches the eggs, and for some time afterwards accompanies the young. The cock, when on the nest, lies very close; I have, myself, almost ridden over one. It is asserted that, at such times, they are occasionally fierce, and even dangerous, and that they have been known to attack a man on horseback, trying to kick and leap on him. My informer pointed out to me an old man, whom he had seen much terrified by one chasing him. I observe in Burchell's Travels in South Africa, that he remarks having killed a male ostrich, and, the feathers being dirty, it was said by the Hottentots to be a nest bird. I understand that the male emu, in the Zoological Gardens, takes charge of the nest: this habit, therefore, is common to the family. Azara states, (vol. iv., p. 173) that a female, in a state of domestication, laid seventeen eggs each at the interval of three days from one another. If the hen were obliged to hatch her own eggs, before the last was laid the first probably would be addled, but if each laid a few eggs at successive periods, in different nests, and several hens, as is stated to be the case, combined together, then the eggs, in one collection, would be nearly of the same age. If the number of eggs in one of these nests is, as I believe, not greater on an average than the number laid by one female in the season, then there must be as many nests as females, and each cock bird will have its fair share of the labour of incubation: and that, during a period when the females could not sit, on account of not having finished laying. I have before mentioned the great number of huachos, or scattered eggs, so that in one day's hunting the third part were found in this state. It appears odd that so many should be wasted. Does it not arise from the difficulty of several females associating together, and persuading an old cock to undertake the office of incubation? It is evident that there must be some degree of association between, at least, two females; otherwise the eggs would remain scattered over the wide plains at distances far too great to allow of the male collecting them into one nest. Some have believed that the scattered eggs were deposited for the young birds to feed on. This can hardly be the case in America, because the huachos, although oftentimes found addled and putrid, are generally whole." —*Darwin's Journal during the Beagle Voyage.*

The Phœnix.—The Phœnix is remarkable as a specimen of fabulous ornithology. This was an eagle of splendid gold and crimson plumage, that came from the woods of Arabia into Egypt only once in some 500 or 600 years. The story of the Phœnix arising from its own ashes is, shortly, that it lives five or six hundred years in the wilderness, and when thus advanced in age builds itself a pile of sweet woods and aromatic gums, and firing it with the wafting of its own wings, thus destroys itself; while from its ashes arises a worm, which in time grows up to be again a phœnix. The Pagans believed, and the Christians have adopted the superstition, that men foredoomed, like this fabled bird of lonely existence, always madly prepare the circumstances in which they are destined to perish.



[The Rohillas.]

TRIBES AND CASTES OF INDIA.

The Rohillas.

The Rohillas were gallant soldiers of fortune from the Afghan mountains, who acquired distinction in the Mogul armies, and were rewarded with lands, principally in that fertile district called Rohilcund, which lies between the Ganges and the mountains. Their countrymen, who were very numerous in the imperial armies, followed the fortunes of their chiefs in peace as in war, and they became the rulers of Rohilcund. Mr. Mill, in his 'History of British India,' says—"It is completely proved that their territory was by far the best governed part of India; that the people were protected; that their industry was encouraged; and that the country flourished beyond all parallel." The soil and climate of Rohilcund are very fine, and the sugar, rice, and cotton bear a higher price than the same commodities from any other part of India. Walnuts, strawberries, grapes, apples, thrive by the side of the toddy and date-palms, and the plaintain. In 1772 the united force of the Rohilla leaders was estimated at 80,000 horse and foot; but the independence of each chief rendered it very difficult to effect a union of the military power, and such a combination was only practicable when some common danger threatened the national existence. This was the necessary consequence of the equality of power among the Rohilla leaders. If any one of them could have singly obtained a manifest superiority in military resources, the lesser chieftains might then have been forced more easily into national enterprises; but the independent spirit of the people would have been gone. In 1772 the Rohillas were surrounded by dangers which called forth the national spirit, and united the chieftains for the defence of the country The terrible Mahrattas were pressing upon them from the south, and they were not less apprehensive of an attack from the Subahdar of Oude, who had long been anxious to take possession of their fine country. The Rohillas were no match for either party, and their object was to gain protection against both. At this juncture, after the Rohilla leaders had temporised both with the Mahrattas and the Subahdar, the latter opened negotiations with the English for gaining possession of Rohilcund with the aid of a British force. Tempted by the offer of a large pecuniary indemnity, which was much wanted in the existing state of the East India Company's finances, the Governor-General, Warren Hastings, seconded and "encouraged" the nefarious proposal. The pecuniary part of the bargain was soon arranged, and by it, according to Hastings, "a saving of near one-third of our military expenses would be effected during the period in which the co-operation of our troops was wanted; the stipulation of forty lacs would afford an ample supply to our treasury; the Vizir (Subahdar) would be freed from a troublesome neighbourhood; and his dominions be much more defensible." Two short months only after the treaty had been concluded the Vizir demanded its fulfilment, and on the 17th of April, 1774, the British forces and those of the Vizir entered the Rohilla territory. The Rohilla leaders wrote to the Vizir expressing their anxiety to come to some terms with him, but his demands were so exorbitant that they gallantly resolved to trust to their arms. Early on the morning of April 23rd the English advanced to the attack. The Rohillas showed great bravery and resolution, and exhibited a considerable share of military knowledge; and it was not until after a cannonade of two hours and twenty

minutes, and a smart fire of musketry for some minutes on both flanks, that they retreated. Above 2000 of the Rohillas, including many Sirdars, or chiefs, fell on the field. The cowardly Vizir with his cavalry and artillery were posted at some distance from the field, and only joined it when the Rohillas had commenced their retreat. The Vizir now became the ruler of the country.

Sixty or seventy years ago it would have been difficult to have avoided exaggeration in speaking of the Rohilla war. The burning denunciations of Burke aroused the deepest regret for the fate of a gallant people sacrificed to the cupidity of a mercantile association. "Authentic" narratives of the war affirmed that 500,000 families of husbandmen and artizans had been driven across the Jumna, and that the fair provinces of Rohilcund had been made a barren and uninhabited waste. Mr. Horace Hayman Wilson, in a note to the new edition of Mill, asserts that the war was not a war against the people, "but against a few military adventurers, who had gained their possessions by the sword, who were constantly at war with their neighbours and with each other, and whose forcible suppression was the legitimate object of the King of Delhi or the Nawâb of Oude. So far was the contest from being national, that the mass of the population of Rohilcund consisted of Hindus, hostile both in religion and policy to their Afghan rulers.... The Hindu inhabitants were no otherwise affected by it than experiencing a change of masters, to which they had been frequently accustomed." Mr. Gleig, in his 'Life of Warren Hastings,' says that the original owners of the soil amounted to two millions, and that the Rohillas had for fifty years exercised a grinding tyranny over them. This statement is incompatible with the account of Mr. Mill, who says expressly that Rohilcund was distinguished for its good government. After their defeat, the Rohillas became robbers and plunderers, or went elsewhere in search of conquest and settlements. Notwithstanding the importance of such an authority as Mr. Hayman Wilson, we cannot but agree with Bishop Heber, that—"The conquest of Rohilcund by the English and the death of its chief in battle, its consequent cession to the Nawâb of Oude and the horrible manner in which Sujah-ud-Dowlah oppressed and misgoverned it, form one of the worst chapters of English History in India." The Bishop adds—"We have since made the Rohillas some amends by taking them away from Oude, and governing them ourselves; but from all which I could learn concerning the present state of the province of Bareilly, the people appear by no means to have forgotten or forgiven their first injuries. The Mussulman chiefs, who are numerous, are very angry at being without employment or hope of rising in the state or army, and are continually breaking out into acts of insubordination and violence, which are little known in the other provinces of the Company's empire, but are favoured here by the neighbourhood of Oude, and the existence of a large forest along the whole eastern, southern, and northern frontier."

JUDICIAL ASTROLOGY.

PART III.

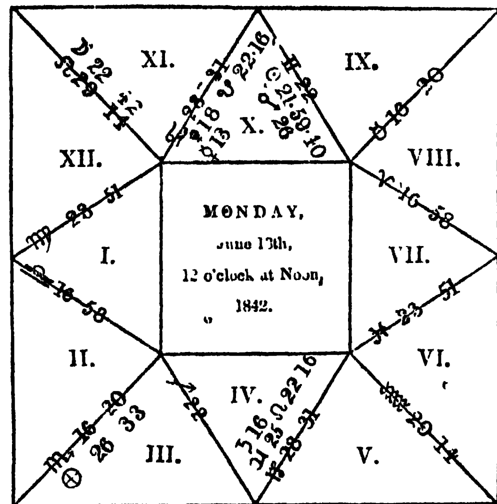
[Continued from p. 392.]

HAVING briefly explained the nature of the twelve celestial houses, the twelve signs of the zodiac, the seven planets, the five principal aspects, the moon's nodes, and that point in the ecliptic called the Part of Fortune, we may proceed to show how they are all set forth in the duodecimal angles of the old fanciful diagram, called the celestial scheme, or the horoscope.

The erecting a figure of the heavens is by no means so difficult or occult a proceeding as many persons may have imagined: with the assistance of a table of houses (given in books of astrology), and an Ephemeris giving the daily places of the planets, it is easily done.

According to the time you set the figure for the table of houses, it will show the degrees and minutes of the signs that are to be placed on the cusps of the respective houses. Having, therefore, drawn the twelve angles of the figure, and placed in them the twelve signs, all that remains to be done is to insert the places of the planets, moon's nodes, and Part of Fortune. This part of the process could be effected much more readily formerly than at present, as some of the old almanacs gave not only the daily, but hourly geocentric, as well as heliocentric places of the planets.

For exemplification, we shall erect a figure from a table of houses calculated for the latitude of 51° 32', and 'White's Ephemeris' for 1842. But as in this instance the geocentric places of the planets are found by a geocentric planetarium (the heliocentric* motion only being given in the Ephemeris), strict astronomical accuracy with respect to minutes, &c. must not be looked for; however, for illustration, and all astrological purposes, they are sufficiently correct. The figure thus erected, considered genethliacally, is in many respects remarkable; promising much that is good, and threatening more that is evil. The Roman numerals show the order of the houses:—



Here we have Virgo, the night-house of Mercury, on the cusp of the first house, or ascendant, and Gemini, the day-house of Mercury, on the culminant, or tenth. Mercury, the lord of the ascendant, and the tenth is posited in the tenth. Venus, lady of the second and the ninth, is in the tenth. Mars, lord of the third and eighth, and the Part of Fortune, is also in the tenth. Jupiter, lord of the fourth and seventh, is posited in the fourth. Saturn, lord of the fifth and sixth, is also in the fourth. Sol, lord of the twelfth, is in the tenth; and Luna, the lady of the eleventh, is in the eleventh. The Dragon's Head is in the fourth, the Dragon's Tail in the tenth, and the ⊕ in the third.

The sign ♍ ascending, makes ingenious and studious persons, and ☿, the lord of the ascendant, being located in the mid-heaven, and lord thereof, declares the native to be of a most admirable fancy and great elocution;

* Heliocentric place is the true place of the planets in the ecliptic, as seen from the sun; Geocentric place, the apparent place of the planets as viewed from the earth.

and as he is also in good aspect of ♀, and in reception of ☽, the person born under his rule will become a most accomplished orator, and be famous as a divine or philosopher. ♀ in the tenth, denotes that the native will be greatly beloved and esteemed, and that he will marry honourably. The mid-heaven, fortified as it is by the presence of ☉, ♂, and ♀, gives eminent honour and renown. But "our life is of a mingled yarn." The person thus accomplished, admired, honoured, and renowned, will have his honours tarnished and his happiness blighted by the envenomed breath of slander and of malice. ♄, the most malignant of the planets, essentially dignified by being in his own house, and in platique conjunction with ♃, afflicts ☿ and ♀ by that most hateful aspect the ☍; and ♂, according to Gadbury, when in the tenth house brings scandal and dishonour to the native, however unmerited on his part. The ☋ also portends, when located in the tenth, a fatal end to the honour of the native; and when ♂, lord of the eighth (the house of death), is posited in the tenth, he declares death to the native by the sentence of a judge. This would be, indeed, a most inglorious termination of a career which promised, at the outset, to be so resplendent; but hope gleams on the horoscope from the brightest star in one of the most brilliant constellations. The Moon is entering into conjunction with Cor Leonis, "the Lion's Heart," in the sign Leo, which gives her six fortitudes—a greater degree of strength than is induced by any other accidental circumstance. The ☉ beholds her with a friendly ⚹ aspect, while she is applying to the same aspect with ♂. ☽ thus fortified, and in reception of ☉, being in his house, is stronger than ♃, the lord of the seventh, who is in the house of ♄, where he has his fall: and when the lord—or lady—of the eleventh is stronger than the lord of the seventh, the friends of the native will be more powerful than his adversaries, and will overcome them. And the mid-heaven well fortified not only gives eminent honour, but such as shall be durable, though it may be subject to interruption. We may therefore hope that the native, even though sentenced by a judge, will be spared from an untimely fate. But whether the good or the evil will ultimately predominate can only be known by directing the significators to their promitors, and converting the degrees of distance into time, and well noting the transits of the planets over the critical parts of the figure. The transit of ♄, the opponent of the significator, over the horoscope, quickly followed by that of ♂, lord of the house of death, will prove fatal to the native. But all this belongs to the calculation of nativities, a process of some elaboration when minutely conducted. As the casting of a nativity was therefore rather expensive, recourse was much more frequently had to horary questions, a process comparatively simple, expeditious, and cheap.

If one department of astrology can be more absurd than another, it is that called the doctrine of horary questions, including *elections*, or the choosing of lucky times for undertaking a voyage, a journey, or entering into any business, and the discovery of lost or stolen property.

This doctrine is founded on the supposition that there is some occult sympathy existing between the heavenly bodies and the animal spirits of man, which works such secret effects upon the latter, that a question of importance to his welfare cannot start from the mind, but in that exact point of time when the planets and signs governing his birth are acting upon the very subject which then engages his thoughts and attention. And hence the birth of the question, like the nativity of the child, unfolds to view its eventual results.

There is, however, much difference of opinion among professors with respect to the nature of those occurrences or concerns of mankind of which the stars are supposed to take cognizance. Some say that we are not to imagine that a glove lost, or hidden in sport or wantonness, is so watched and attended to by the heavenly intelligencers, that they must needs point out where the piece of leather is to be found; for although they may aptly respond to our serious and important concerns, yet that they should as readily satisfy our intemperate desires and be subservient to our frolics is too ridiculous to be believed. Others contend, with more consistency, that the stars, being cognitive of all events, and no respecters of person, watch with equal care whatever has strayed from its owner, whether it be a leather glove or a diamond necklace. Gassendus, in his 'Vanity of Judiciary Astrology,' says, it is injurious to the stars to dishonour them with the imputation of such power and efficacy as is incompetent to them, and to make them many times the instruments not only to men's ruin, but to all their vicious inclinations and detestable villainies."

In resolving horary questions the first things to be considered are the significators of the Querent and the Quesited. The querent is the person who proposes the question to the artist, the quesited is the person or thing inquired after.

The ascendant, its lord, and the moon, are the significators of the querent. The significators of the quesited are the house to which the question refers, and the planet (if any) therein.

There are, of course, a great variety of questions belonging to each house. All questions relating to life and the good and evil attending it must be referred to the first house, questions relating to riches to the second, and so on. But those which appertain to the seventh, and relate to marriage and stolen property, have generally given the most employment to the astrologer, whose adroitness in discovering thieves is admirably ridiculed in the following lines of 'Hudibras:'—

> "They'll search a *planet's house* to know
> Who broke and robb'd a *house below*;
> Examine Venus and the Moon,
> Who stole a thimble or a spoon:
> And tho' they nothing will confess,
> Yet by their very looks can guess,
> And tell what guilty aspect bodes,
> Who stole, and who receiv'd the goods.
> They'll question Mars, and by his look
> Detect who 'twas that nimm'd a cloak:
> Make Mercury confess and 'peach
> Those thieves which he himself did teach;
> Cast the nativity of the question,
> And from positions to be guess'd on,
> As sure as if they knew the moment
> Of native's birth, tell what will come on't."

Mr. Smith, of Harleston (*vide* Grey's 'Notes to Hudibras'), has stated "that when any one came to an astrologer to have his child's nativity cast, and had forgotten the hour and minute when it was born, which were necessary to be known, in order to the erecting a scheme for the purpose, the figure-caster, looking upon the inquirer as wholly influenced, entirely guided by the stars in the affair, took the position of the heavens the minute the question was asked, and formed his judgment accordingly of the child's future fortune, just as if the child had been born the very same moment that the question was put to the conjuror;" and no doubt it answered the purpose just as well.

The rules for discovering the age, sex, and character of the thief, the place where the stolen property is concealed, and the distance it is from the owner's house, are exceedingly droll. If the significator of the thief be in a masculine sign, the thief is of the male sex; if in a feminine sign, the thief is a female. The masculine signs (fiery and airy) are ♈, ♊, ♌, ♎, ♐, ♒. The feminine (earthy and watery) are ♉, ♋, ♍, ♏, ♑, ♓

If ♄ be the significator, the thief is old; if ♃, ♂, or ☉, he is about thirty; if ♀, younger; if ☿, a youth under twenty; and if ☽, according to her age, *i.e.* in the first quarter, a youth (if in the beginning of a sign, a child); in the second, between twenty and thirty; in the third, between thirty and forty; and in the last quarter, between forty and fifty; if in the latter part of a sign, between fifty and sixty. If many planets afflict the house of wealth, its lord, or the Part of Fortune, there are more thieves than one. If the significator of the goods be with the significator of the thief, or the lord of the seventh, the goods are with the thief. If the lord of the second be in the second, the goods are in the owner's premises. If it do not appear that the goods are with the thief or the owner, observe the distance between the lord of the ascendant and the lord of the second, and allow for every degree in a moveable sign seventeen houses or furlongs; for every degree in a common sign, five houses or furlongs; and for every degree in a fixed sign, one house or furlong. If the ☽ and the ☉ behold the ascendant or its lord with a good aspect, the goods will be soon recovered; and the ☽ being with ♃ or ♀ in the ascendant, denotes the same. When the lord of the ascendant comes to the place of ⊕, or to the cusp of the second, it shows the very day of recovery.

To know when or in what period of time any projected business may be accomplished, or any desired object attained, take the number of degrees the significators are apart from each other, and turn them into time, thus:—If the significators be swift in motion, the degrees, in moveable signs, give days; in common signs, weeks; and in fixed signs, months: but if the significators be slow in motion, then the degrees, in moveable signs, give weeks; in common signs, months; and in fixed signs, years. For example: Should a lady desire to know when her marriage with the gentleman who is paying his addresses to her will take place: if her significator be in 15° of ♈, and the significator of the gentleman be in 15° of ♉; then the time given by the lady's significator, if swift in motion, will be fifteen months and fifteen days; and by the gentleman's significator, if slow in motion, sixteen years and three months (a long time to wait); but if swift in motion, the time given by the two significators will coincide, and then union will take place in fifteen months and fifteen days from the time of asking the question. There is, however, another rule:—If the significators are immediately applying to a conjunction, or good aspect, then for the true time of performance observe the day on which the said conjunction or aspect will take place: this is said to be an excellent rule, and not commonly known to astrologers.

When the significators are in double-bodied signs, they declare that the querent will marry more than once, and Manilius seems to be of that opinion when he says—

> "Those signs are single: now observe the pairs,
> For *double shapes* give *double force* to stars."

With respect to the doctrine of elections, or the selecting of lucky times for the commencement or performance of any kind of business, it may be observed, that it contravenes the hypothesis of fate, upon which the whole system of astrology is founded. Dryden has well observed—

> "On what strange ground we build our hope and fears!
> If fate be not, then what can we foresee?
> And how can we avoid it, if it be?"

And Sir Christopher Heydon, the great advocate for astrologers, has affirmed that the efficacy of the stars cannot be frustrated without a miracle.

If all the events of life be determined by the configuration of the stars at the time of our birth, we can only choose according to our destiny; for the supposition that we can, by any election, avoid the decrees of fate, involves a contradiction; it implies that that which is immutable may be changed. But preposterous as the doctrine is, with reference to the basis of astrology, it has furnished the professors of the art with much employment. People used to go to them to be informed of lucky times for undertaking a journey or a voyage, for getting married, going to borrow money, going to law, and purchasing tickets in the lottery. It was also a common practice for those who had bought a ticket or share in the lucky hour prescribed, to go again to the artist to know whether the number they held would be drawn a blank or a prize!

We have seen a scheme that was erected for the purpose of ascertaining whether the ticket No. 24,642, an eighth of which had been purchased by the querent, Jan. 30th, 1786, would be drawn a blank or a prize. In this figure the ☉, lord of ⊕, the ☽, and ♀ are in conjunction with ♄ in his own house ♑; and ☿, lord of the house of wealth, is applying to bad planets; all these positions denoted that the ticket would be drawn a blank, which happened accordingly, on the 10th of February following, when ☽ was in opposition to ☿, lord of the second house. When the person at whose instance the figure had been drawn remonstrated with the astrologer for having sold to him for a lucky hour one which had turned out to be so unpropitious, he was told that as the ticket had been sold in eighths, of which he held one, there were probably seven other persons who had purchased the remaining shares in unlucky hours; and it was a maxim in astrology that the *general calamity* overwhelmed the individual destiny. A truly consolatory explanation!

[To be continued.]

The Mygale, or gigantic American Spider, erroneously called the bird-spider, is three inches in length and eleven inches in the expansion of its legs. It is figured and described in the splendid work of Madame Merian upon the insects of Surinam; and there described as living in trees and hunting and devouring birds, particularly humming-birds, which, like our swallows, scarcely ever light on a tree. She was imposed upon by some cunning negroes whom she paid for collecting wonders for her; and as they found the greater the wonder the better the reward, hence this story has got recorded and widely circulated. Its proper name is Mygale; it is a ground-spider that makes a cave for itself, and lives in it like a bandit watching for prey. It weaves no web, and therefore cannot catch any birds. But mankind in general like marvellous stories, and plain truth always seems to travel much slower than lies. See memoir of Madame Merian, in the 11th vol of Jardine's 'Natural History' where the error is explained, and where they say that "the size and ferociousness of the spider is true enough, but it is a ground-spider, living in tubes under ground, and its food consists of wood-lice, subterranean crickets, and cockroaches."

Dragons.—Of fancy monsters, the winged, scaly, fiery dragon is by far the most poetical fabrication of antiquity.* To no word, perhaps, are attached ideas more extraordinary, and of greater antiquity, than to that of dragon. We find it consecrated by the religion of the earliest people, and become the object of their mythology. It got mixed up with fable and poetry and history, till it was universally believed, and was to be found everywhere but in nature. In our days nothing of the kind is to be seen, except a harmless animal hunting its insects. The light of these days of intelligence has driven the fiery dragons to take refuge among nations not yet visited by the light of civilization. The *Draco volans* is a small lizard, and the only reptile possessing the capacity of flight. For this purpose it is provided, on each side, with a membrane between the feet, which unfolds like a fan at the will of the animal, enabling it to spring from one tree or branch to another while pursuing its food. It is a provision similar to that of the flying squirrel, enabling them to take a longer leap.

[Nest of Common Hornet [illegible] Vespa Britannica (Insect and Nest) [illegible] Vespa holsatica (Insect and Nest) [illegible]]

CURIOSITIES OF BRITISH NATURAL HISTORY.

Wasps and their Nests.

Every one knows the Common Wasp (*Vespa vul-garis*), every one has observed its abundance at the latter part of summer and the beginning of autumn—its fondness for sweet fruits, sugar, and flesh—and its propensity to attack and devour weaker insects. Many perhaps of our readers have assisted in storming a wasps' nest, or vespiary, and have experienced the danger attendant upon the assault; but they may not clearly understand the structure of that insect-city, nor the habits and economy of its crowded population. It will be our endeavour to make these points as clear as possible. We may premise by saying, that in many respects there is great similarity between the operations of these insects and of the Humble-Bees detailed in a recent number. A vespiary during the season of bustle and activity contains the following inhabitants:—1, females of two sorts, a large variety, the founder of a future colony, and a smaller variety, producing, it is believed, only male eggs; 2, workers; 3, males; 4, eggs and young. But there is no honey, no store of food. All these busy creatures, however, are destined to perish when the severity of winter sets in, all, except a few of the larger females of the year, which become torpid, and thus survive the dreary months of frost and cold. Let us take one of these slumbering females and trace her operations.

We must suppose that before retiring to her dormitory she had paired with a mate. Spring approaches, and the warm beams of the sun give life to vegetation and call forth leaves and flowers. The birds are preparing their nests, the swallow has appeared, the note of the cuckoo resounds in the fields, and "the voice of the turtle is heard in our land." Revived by the genial temperature, the solitary foundress of an empire issues forth, and soon commences her labours. Her first object is to make or appropriate and enlarge a subterranean chamber. For this purpose she explores sunny banks and old deep thatches in quest of suitable location. She may perhaps meet with the deserted burrow of a shrew or field-mouse, and enlarge it according to her discretion; but generally, we think, as far as our own observations go, she makes her own cavern. This consists of a large chamber from one to two feet in diameter, to which a narrow winding en-

trance leads from the surface, and we may easily conceive, even if this retreat had been in part prepared for her, what a work of toil and patience she has to accomplish. But it is at last accomplished, yet her labour is not ended: it is well that her mandibles are strong and her limbs vigorous, for she has further service for them to perform. She has to construct her walled citadel, with its arrangement of floors and cells; not that she completes it, but she begins it, she forms a certain number of cells, perhaps several hundred, and in these she deposits her eggs, the eggs of workers, destined to be her assistants. These eggs are attached by means of a strong gluten to the walls of the cells, and are watched over with great care and apparent anxiety. They are soon hatched, and the grubs, or larvæ, are fed and attended to till they change to the pupa state; in this they remain a few days, and then come forth a crowd of obedient workers, ready within the course of twelve hours to assist their parent queen. They set about enlarging and perfecting the vespiary; they construct additional tiers of cells, in which the queen deposits the eggs of females and other workers; they are assiduous in their care of the newly hatched larvæ, feeding them and eagerly collecting nutriment for their sustenance. For this purpose they disperse themselves in different directions, or in a body visit some storehouse of sweets; hundreds may be seen in open sugar-casks before the door of a grocer's warehouse, many venture within the shop itself, some attack the hives of bees and endeavour to rob them of honey, others direct their course to gardens and orchards, and bushels of the ripest greengages have we seen spoiled by their ravages. Loaded with sweet food, but not, like the bee, with the nectar of flowers, they return to their charge, and, visiting cell after cell in succession, supply each restless craving larva with its allotted portion. It would appear that the larger grubs require more substantial nutriment. For these they bring home captured flies and bits of meat stolen from the butcher's stall, and with these dainties feed their expectant younglings. Thus are they ever busy, ever on the alert; for no sooner has one brood become perfected than another is in progress. Thus from being a solitary unassisted being, the queen mother finds herself, before the close of summer, surrounded by thousands.

Kirby and Spence observe that "the number of cells in a vespiary sometimes amounts to more than sixteen thousand, almost all of which contain either an egg, a grub, or a pupa. Each cell serves for three generations in the year, which, after making every allowance for failures and other casualties, will give a population of at least thirty thousand. Even at this time, when she has so numerous an army of coadjutors, the industry of this creature does not cease, but she continues to set an example of diligence to the rest of the community. If by accident, before the other females are hatched, the queen mother perishes, the neuters cease their labours, lose their instincts, and die. The number of females in a populous vespiary is considerable, amounting to several hundred. They emerge from the pupa about the end of August, at the same time with the males, and fly in September and October, when they pair; but of this large number of females, few survive the winter." We may add, that it is upon those few that the perpetuation of the race depends.

We have said that the workers assist materially in the care of the larvæ, and in the extension and reparation of the vespiary: they are in fact the active servants of the queen. Some of them are necessarily engaged in-doors, while others are employed abroad on foraging expeditions for food. But the wants of the in-door labourers are not neglected: the foragers return, and after supplying the appetites of the larvæ, distribute the surplus, which they appear to do with great impartiality. Disgorging the saccharine juice drop by drop, part is given to the workers, part to the females, and part to the males; and each honey-bearing worker is attended by several, each receiving its ration. Unlike the males of the bee, the males of the wasp are not idle: they do not, it is true, collect food or repair the vespiary, but they busy themselves in keeping it clear of extraneous substances, they remove all offensive matter, and carry out the bodies of such of the community as may chance to die in the place. They are, in short, labourers of an inferior class, but still indispensable for the general good. They exceed the workers in size, but are less than the large females.

So far all has gone on with order and in harmony: but October is closing, and the rigour of winter has set in; they have laid up no store of food, and numerous cells are occupied by larvæ. It would seem as if a sudden frenzy had seized the active tenants of the vespiary: their devoted attachment to the young is changed to apparent hatred; they drag the larvæ out of their cells, sting them, and so destroy them, scattering their lifeless bodies around the entrance of the vespiary. Is it in mercy to their young that they are thus instincted to act, thereby preventing the pangs of hunger and a lingering death? or has their disposition undergone a radical change? or rather, are they not impelled to it by that strange overstrained feeling of morbid anxiety for the young which leads the rabbit and some other animals to destroy and devour their offspring if disturbed at an early age in the nest? Be this as it may, thus it would appear are the larvæ sacrificed: but the death of their destroyers is at hand. After lingering a little while, they all perish; and the busy bustling vespiary, so lately the scene of industry and order, is silent and tenantless. We have said all perish; this is not quite the case: perhaps two or three of the more powerful and vigorous females, instead of sinking into death, pass into a state of numbness and lethargy, reviving on the return of spring. In very wet or very severe seasons the number of females which thus escape is less than it is in a mild winter; and it often happens, from the vespiary becoming deluged, that not one escapes the general fate. In some vespiaries, according to their situation and other circumstances, more females will survive than in others; but in none is the number considerable. Even in the spring, when the female is engaged with her first brood, heavy rains will sometimes flood the new and unfinished vespiary, and destroy the queen mother and her larva progeny. It is from these and similar causes most probably that the abundance of wasps varies in different years, their numbers being comparatively scanty one summer compared with what they are another summer.

We have hitherto said nothing of the structure and material of the vespiary itself. It is time that we turned our attention to it. The vespiary then is made of paper, or "papier-maché." Yes, the wasp is a paper-manufacturer, and, time immemorial, "ere Greece and Rome had writ their annals," did it prepare this invaluable material; so that the wit of man in this, as in other things, has been forestalled by instinct. But it may be asked, by what process and from what raw material is this paper made? It is made from the fibres of wood. The insects, by means of their strong mandibles, tear away and bite off filaments or minute fragments from half-decayed trees, from posts, rails, palings, and the like, which have been well weathered. Long had the material with which the wasp makes her vespiary puzzled scientific inquirers, and it was reserved for M. Réaumur to discover the secret. It was by chance

that he saw a female wasp alight on the sash of his window and begin with her mandibles to detach slender fibres from the wood, little more than a line in length, and gather them into a bundle with her feet, adding to it from other parts of the woodwork favourable from her purpose. He observed that before detaching each fibre she bruised it in her mouth, adding it to the rest. He examined her bundle—he imitated it, and by means of a pen-knife produced one similar;—the material of the vespiary was discovered. The observations of Réaumur have been confirmed again and again, and may be verified by any person who will take a little pains to satisfy himself. These filaments, thus collected, are carried home, and masticated into a sort of pulp by the addition of a viscid saliva, which blends the whole into a ductile mass, capable of being spread out, or moulded into the required form. The work, executed by a multitude of wasps, is conducted with the utmost order, and proceeds with great rapidity—each has its allotted station, and is ready with its ball of *papier-maché*.

We have stated that the wasp makes its vespiary in a chamber underground or in deep old thatch. The vespiary itself is of a roundish or oval figure: externally it presents a coat of tiling, or rather of thin overlapping pieces of greyish paper, like little flat oyster-shells; these cover a number of layers one above another (fifteen or sixteen), constituting the wall, within the hollow of which the plates of cells or combs are arranged. These in a finished vespiary are from twelve to sixteen in number, and are placed not vertically, as in the beehive, but horizontally, the cells being on the under side of each table, with the mouths downwards. These tables are not only fixed to the sides of the outer walls, but have their centre supported by suspension rods, like colonnades of pillars with the base and capital wider than the shaft. The top of each table forms a floor, where, amidst the suspension rods, the wasps can walk about, attending to the young in the cells above their heads, having a clear space of about half an inch from the cells to the platform. Two holes at the bottom of the nest, to each of which a covered way leads, are the doors (one of egress, one of entrance) of the vespiary, and orifices admit of access from one stage to the other. The whole structure is generally about three feet in circumference,—we have seen larger and smaller. In the building of this beautiful structure, the dome is first finished, and the first comb, or table with pendent cells, laid across; the dome is then brought lower down, and another plate added, and secured to the former by stout suspension rods. The first layer or two is the work of the solitary female, the workers in due time come to her assistance, and carry on the operations, which are not completed till the middle or close of autumn. Winter comes, and it then only serves as the dormitory of a few torpid females: these in the spring commence the whole over again, for the same structure is never used a second season.

The hornet (*Vespa Crabro*) builds essentially the same kind of structure as the wasp, but of coarser material; the colour of the papier-maché is generally of a yellowish brown. The hornet often builds in hollow logs or the holes of decayed trees, which they enlarge to suit the size of the vespiary. Their strong mandibles enable them to do this with ease, and even, as we learn from Réaumur, to bore a winding way to the nest through the solid and undecayed substance of the tree, carrying away the portions they gnaw off. It is not, however, always in the hollows of trees that the hornet rears its vespiary; it often places it in thatch, or under the tiles of old barns or outhouses, or in dark obscure nooks, as does also the wasp.

One species of wasp in England (*Vespa holsatica*) builds a pendent oval vespiary with a smooth outside, attached to the branches of a shrub or tree; the aperture is at the pendent apex. We once saw the nest of a species of wasp, perhaps the *Vespa Britannica*, built in a gooseberry-bush in a garden a little distance from Buxton in Derbyshire; it was pendent, and loosely constructed externally of foliaceous layers. The entreaties of some females in the party prevented our securing it.

There is also a British species (*Odynerus Parietum*) which builds a group of eighteen or twenty crucible-like cells, attaching them to palings or other woodwork, without any case or covering. Among the most interesting nests of wasps which we have seen and examined is one of a species in South America: it is pensile, and suspended from the branch of a tree; its shape is like two cones base to base, but of different lengths, the shorter cone pointing downwards. Its external wall is composed of stout, tough, white card-board, which takes ink from a pen extremely well; it is smooth and fine-grained. The aperture for admission is at the lower apex; the length of the nest is nine inches; the circumference at the widest part, where the two cones meet, about eighteen inches. Internally six stout layers or floors stretch horizontally across, smooth above, with hexagonal cells below: These platforms are not, however, flat, but concave above, like a watch-glass reversed. The centre of each is perforated for admission at the extremity of a short funnel-like projection; and by this aperture access is gained from story to story. The whole in fact is a masterpiece of workmanship, and an exquisite display of the results of instinct.

We have stated that the wasp is not a collector of nectar and a storer of honey. This assertion does not apply to certain foreign species. In the 'Magazine of Natural History,' 1841, the nest of a honey-wasp is described and figured. The species is new, and from South America. Its describer, Mr. White, has given it the scientific title of *Myrapetra scutellaris*, and observes that it is the same as that of which Azara gives many interesting details, under the name of the 'Chiguana Wasp.' The general form of this nest, which is suspended to a slender branch, is ovate; its external wall consists of stout cardboard thickly covered with conical knobs of various shapes, which are firm and solid. Its inner structure bears great resemblance to that of the last described, but the doors of access from story to story are at the sides of each platform. The external entrances are protected by knotted pent-roofs, as a security against rain. The combs or platforms are fourteen in number, and many of the cells were found to contain honey, but time had rendered it nearly tasteless (p. 315, *et seq.*). Besides this species, several other South American wasps also store honey, as was observed by Azara, and also by M. Auguste de St.-Hilaire. The latter naturalist found, as he states, near the river Uruguay, an oval grey-coloured nest of a papery consistence, like that of the European wasps, suspended from the branches of a small shrub about a foot from the ground. He and two attendants partook of the honey, which was of very superior flavour, but which produced poisonous effects both on himself and his attendants. The insect he named *Polistes Lecheguana*. (See 'Ann. des Sc.,' 1824, vol. iv., p. 335; and also Mr. White's Paper above referred to.) We may observe that the honey of bees, where poisonous plants abound, has been known to produce deleterious effects; but whether the wasp's honey in question was noxious merely by accident, or whether such is always its nature, does not appear to be ascertained.



[St Christopher.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XVIII.

ANDREA MANTEGNA (*continued*)—THE INVENTION OF ENGRAVING IN WOOD AND COPPER: 1423-1452.

ANDREA Mantegna was not only eminent as a painter: he owed much of his celebrity and his influence over the artists of that age to the multiplication and diffusion of his designs by copper-plate engraving, an art unknown till his time: he was one of the first who practised it; certainly the first painter who engraved his own designs.

In these days, when we cannot walk through the streets even of a third-rate town without passing shops with their windows filled with engravings and prints, when not our books only but the newspapers that lie on our tables are illustrated; when the 'Penny Magazine' can place a little print after Mantegna at once before the eyes of fifty thousand readers; when every beautiful work of art as it appears is multiplied and diffused by hundreds and thousands of copies—we find it difficult to throw our imagination back to a time when such things were not.

What printing did for literature, engraving on wood and copper has done for painting—not only diffused the designs and inventions of artists, which would otherwise be confined to one locality, but in many cases preserved those which would otherwise have perished altogether. It is interesting to remember that three inventions to which we owe such infinite intruction and delight were almost simultaneous. The earliest known impression of an engraving on wood is dated 1423; the earliest impression from an engraved metal plate was made about 1452; and the first printed book, properly so called, bears date according to the best authorities, 1455.

Stamps for impressing signatures and characters on paper, in which the required forms were cut upon blocks of wood, we find in use in the earliest times. Seals for convents and societies, in which the distinctive devices or letters were cut hollow upon wood or metal, were known in the fourteenth century. The transition seems easy to the next application of the art, therefore it is, perhaps, that the name of the man who made this step is lost. All that is certainly known is, that the first wood-blocks for the purpose of pictorial representations were cut in Germany, in the province of Suabia; that the first use made of the art was for the multiplication of playing-cards, which about the year 1418 or 1420 were manufactured in great quantities at Augsburg, Nuremberg, and Venice; and that the next application of the art was devotional,—to multiply rude figures of saints, which were distributed among the common people. The earliest wood-cut known is a coarse figure of St. Christopher, dated 1423. This curiosity exists in the library of Earl Spencer at Althorpe.* Another impression, which is declared by connoisseurs to be a little later, is in the Royal Library at Paris, where it is framed and hung up for the inspection of the curious. Rude, ill-drawn, grotesque—printed with some brown-

* A reduced imitation of this earliest known wood-cut is given above, for which we are indebted to Mr. Jackson, who engraved it for his 'Treatise on Wood-Engraving.'

ish fluid on the coarsest ill-coloured paper—still it is impossible to look at it without some of the curiosity, interest and reverence with which we regard the first printed book, which, however, in comparison with this first sorry specimen of a wood-cut, was a beautiful performance.

Up to a late period, the origin of engraving on copper was involved in a like obscurity, and volumes of controversy have been written on the subject, some claiming the invention for Germany, others for Italy: at length, however, the indefatigable researches of antiquarians and connoisseurs, aided by the accidental discovery in 1797 of the first impression from a metal plate have set the matter at rest. If to Germany belongs the invention of engraving on wood, the art of copper-plate engraving was beyond all doubt first introduced and practised at Florence; yet here again the invention seems to have arisen out of a combination of accidental circumstances rather than to belong of right to one man. The circumstances, as well as we can trace them, were these:—

The goldsmiths of Italy, and particularly of Florence, were famous in the fifteenth century for working in *Niello*. They traced with a sharp point or graver on metal plates, generally of silver, all kinds of designs, sometimes only arabesques, sometimes single figures, sometimes elaborate and complicated designs from sacred and profane history. The lines thus cut or *scratched* were filled up with a black mass of sulphate of silver, so that the design traced appeared very distinct contrasted with the white metal. In Italy the substance used in filling up the lines was called from its black colour, in Latin *nigellum*, and in Italian *niello*. In this manner church plate, as chalices and reliquaries, also dagger-sheaths, sword-hilts, clasps, buttons, and many other small silver articles, were ornamented. In Sir John Soane's Museum there is an old MS. book, of which the binding exhibits some beautiful specimens of niello-work of the fifteenth century: those who practised the art were called *niellatori*.

According to Vasari's account, Maso Finiguerra was a skilful goldsmith, living in Florence; he became celebrated for the artistic beauty of his designs and workmanship in niello. Finiguerra is said to be the first to whom it accidentally occurred to try the effect of his work, and preserve a memorandum of his design in the following manner:—Previous to filling up the engraved lines with the *niello*, which was a final process, he applied to them a black fluid easily removed, and then laying a piece of damp paper on the plate or object, and pressing or rubbing it forcibly, the paper imbibed the fluid from the tracing, and presented a fac-simile of the design, which had the appearance of being drawn with a pen. That Finiguerra was the first or the only worker in *niello* who used this method of trying the effect of the work is more than doubtful, but it is



[Pax of Maso Finiguerra.]

certain that the earliest known impression of a niello plate is the impression from a pax* now existing in the church of S. Giovanni at Florence, executed by Finiguerra, and representing the subject we have often alluded to—the Coronation of the Virgin by her Son the Redeemer, in presence of Saints and Angels; it contains nearly thirty minute figures most exquisitely designed. This relic is preserved in the royal library at Paris, where it was discovered lying among some old Italian engravings by the Abbé Zani. The date of the work is fixed beyond all dispute; for the record of the payment of sixty-six gold ducats (32*l.* sterling) to Maso Finiguerra for this identical pax still exists, dated 1452. The only existing impression from it must have been made previously, perhaps a few weeks or months before. It is now, like the first wood-cut, framed and hung up for the inspection of the curious, and we have given a copy in the preceding page.

Another method of trying the effect of niello-work before it was quite completed, was by taking the impression of the design, not on paper, but on sulphur, of which some curious and valuable specimens remain. After seeing several impressions of niello plates of the fifteenth century, we are no longer surprised to find skilful goldsmiths converted into excellent painters and sculptors. In our own time this art, after having been forgotten since the sixteenth century, when it fell into disuse, has been very successfully revived by Mr. Wagner, a goldsmith of Berlin, now residing at Paris.

We have no evidence that it occurred to Maso Finiguerra, or any other niello-worker, to engrave designs on plates of copper for the express purpose of making and multiplying impressions of them on paper. The first who did this as a trade or profession was Baccio Baldini, who, about 1467, employed several painters, particularly Sandro Botticelli (of whom we have spoken already) and Filippino Lippi, to make designs for him to engrave. Andrea Mantegna caught up the idea with a kind of enthusiasm: he made the first experiment when about sixty, and, according to Lanzi, he engraved, during the sixteen remaining years of his life, not less than fifty plates: of these about thirty are now known to collectors, and considered genuine.

Familiar as we now are with all kinds of copperplate and wood-engraving, there are persons who do not understand clearly the difference between them. Independent of the difference of the material on which they are executed, the grand distinction between the two arts is this,—that the engraver on copper cuts out the lines by which the impression is produced, which are thus left hollow, and afterwards filled up with ink; the impression is produced by laying a piece of wet paper on the plate, and passing them under a heavy and perfectly even roller. The method of the engraver on wood is precisely the reverse. He cuts away all the surrounding surface of the block of wood, and leaves the lines which are to produce the impression prominent; they are afterwards blackened with ink like a stamp, and the impression taken with a common printing-press.

When Andrea Mantegna made his first essays in engraving on copper, he does not seem to have used a press or roller; perhaps he was unacquainted with that implement. At all events the early impressions of his plates have evidently been taken by merely laying the paper on the copper-plate, and then rubbing it over with the hand; and they are very faint and spiritless compared with the later impressions taken with a press.

* A pax or pix is the name given to the vessel in which the consecrated bread or wafer of the sacrament was deposited. This vessel was usually of the richest workmanship, often enriched with gems.

USES OF THE WALNUT-TREE.

The walnut-tree is one of a kind not very extensive in this country, viz., those of which both the timber and the fruit are largely available. The majority of our timber-trees do not yield fruit eaten by man; while the majority of our fruits are obtained from plants not yielding available timber. The walnut-tree affords, in its timber, its fruit, its sap, its roots, and its bark, many useful products, which sufficiently demand our attention; though writers of former time seem to have attributed to this tree virtues more in number than are at present recognised in it. Cowley, in one of his poems, draws a fanciful analogy between the walnut-fruit and the brain, both in shape, in "seam-joined shell," in membrane within the shell, in pericardium without the shell, and in hairy filaments external to all. He then enumerates a few of its excellencies:—

> "Her timber is for various uses good:
> The carver she supplies with useful wood;
> She makes the painter's fading colours last;
> A table she affords us, and repast;
> E'en while we feast, her oil our lamp supplies;
> The rankest poison by her virtues dies,
> The mad dog's foam, and taint of raging skies.
> The Pontic king, who lived where poisons grew,
> Skilful in antidotes, her virtues knew."

Lastly, he bemoans the unfair usage which the tree receives:—

> "Yet envious fates, that still with merit strive,
> And man, ungrateful, from the orchard drive
> This sovereign plant; excluded from the field,
> Unless some useless nook a station yield,
> Defenceless in the common road she stands,
> Exposed to restless war of vulgar hands."

The walnut forms a lofty tree with spreading branches, with a thick and deeply-furrowed bark. It was originally brought from Persia, and was found by Pallas in the Russian provinces of the Caspian. At what period it was introduced into Europe is not known; but it was cultivated by the Romans before the death of the emperor Tiberius, and is supposed to have been brought from Greece by Vitellius. Ovid alludes to the custom of the nuts being knocked off the trees by boys, and to another custom of the bride and bridegroom at a wedding throwing walnuts among the boys who surrounded them. The walnut-tree became by degrees planted in almost every country in Europe, and was particularly valued in France for its fruit, oil, and wood. Thus Evelyn says:—"Burgundy abounds in walnut-trees, where they stand in the midst of goodly wheat-lands, at sixty and a hundred feet distance; and so far are they from hurting the crop, that they are looked upon as great preservers, by keeping the ground warm; nor do the roots hinder the plough. Whenever they fell a tree, which is only the old and decayed, they also plant a young one near him; and, in several places, betwixt Hanau and Frankfort, in Germany, no young farmer whatsoever is permitted to marry a wife till he bring proof that he is father of such a stated number of walnut-trees; and the law is inviolably observed to this day, for the extraordinary benefit which this tree affords to the inhabitants." The marriageability of a farmer does not probably now depend on the possession of walnut-trees; but the prevalence of the custom in Evelyn's time singularly illustrates the value placed upon the tree.

The wood of the walnut is white in young trees, but as the tree grows older, the wood becomes solid, compact, easy to work, veined, and having a brown

colour shaded with light brown and black. Mr. Selby says that previous to the introduction of the mahogany and other beautiful exotic woods, that of the walnut was held in higher estimation than any other European tree, and supplied their place in the manufacture of the most valuable and costly pieces of furniture, examples of which are still occasionally to be seen in houses of ancient date, whose beauty in grain, polish, and pattern would bear comparison with the elegant woods of the present day.

Among the uses enumerated by Mr. Loudon to which walnut-wood is applied, are screws for presses, sabots, clogs, musical instruments, gun-stocks, and other articles made by turners, cabinet-makers, joiners, coachmakers, and millwrights. Its use for gun-stocks has led to singular results, both commercial and agricultural. On different occasions, when the supply of wood has been scarce, the gun-stock makers have given very high prices for it. In the winter of 1709 a large number of walnut-trees were killed in Switzerland, France, and Germany: and the Dutch, foreseeing therefrom the probable scarcity of walnut-wood, bought up all the trees they could procure, and sold them again in subsequent years at very advanced prices. In 1720 an Act was passed in France to prevent the exportation of walnut-timber, on pain of confiscation, and payment of a fine of three thousand livres. During the wars of France the number of gun-stocks made was so large in that country, that twelve thousand walnut-trees were required in the year 1806 for this purpose: and hence many persons were led to plant such trees on speculation. In England, also, the value of walnut-wood became so high, that as much as 600*l.* was given for a single tree. This led to the importation of the black walnut from America, by which the exorbitant value of the common walnut was effectually lessened. In consequence of the substitution of mahogany and other tropical woods for articles of furniture, and of gun stock wood from the Black Sea and North America, the cultivation of the walnut as a timber-tree has declined in this country. Evelyn devotes much attention to the timber of this tree. He recommends its use for household furniture, utensils, and wainscoting; and he says that the joiners of Grenoble, in order to give a better colour to the wood, "put the boards into an oven after the batch is forth, or lay them in a warm stable; and, when they work it, polish it over with its own oil, very hot, which makes it look black and sleek; and the older it is, the more estimable; but then it should not be put in work till thoroughly seasoned, because it will shrink beyond expectation."

The fruit of the walnut has long been celebrated. It is of a roundish oval form, green externally, with a nut occupying about two-thirds of the bulk. Towards autumn the green husk softens, and by its decay allows the nut to fall out. In the young and green state the fruit is pickled; while in a more mature state the enclosed nut is eaten—as a luxury in some countries, and as an article of food in others. In some parts of Italy, France, and Switzerland, when the fruit is nearly ripe, a traveller may walk for many miles under a continuous grove of walnut-trees, with the fruit hanging over his head; and Mr. Loudon says that he has known the case of a person who travelled by a public conveyance from Florence to Geneva, eating scarcely anything by the way except walnuts and heads of maize, which he gathered by the road-side. The fruit, both in France and England, is commonly knocked down from the tree by threshing the extremity of the branches with long poles; or, which is deemed a better plan, by shaking the branch without beating it. In gathering up the fruit, those nuts which have separated from the husks are kept by themselves, taken home, and spread in a layer on the boarded floor of an airy room, where they are turned over daily till dried. Those fruits from which the husks are not separated in falling, are placed in heaps by themselves, and are turned and gently beaten till the husks separate. When the nuts have been thus separated from the husk, they are either used to obtain walnut-oil, or are eaten in the raw state, or are otherwise prepared as an article of food. About the end of September or the beginning of October the nuts are in the fit state to be eaten raw; and they may be preserved for many months by burying them in dry soil or in sand, so deep as to be out of the reach of frost, sun, and rain; or else by placing them in dry cellars, and covering them with straw.

The French prepare a dish consisting of the green kernel of the nut, scooped out from the shell about a fortnight before being ripe, and eaten with salt, vinegar, pepper, and shallots. It is at a somewhat earlier period, viz., about the month of June, that the walnuts are in a fit state for preserving: they are preserved either with or without the husks, the former being deemed more wholesome, but the latter more agreeable. About the same time, too, they are in a fit state for pickling. Of the dried kernels, a *conserve brûlée* is made in France, which is much relished. In Spain the gratings of old and hard walnuts are strewed over tarts and sweetmeats.

The use of the walnut for procuring oil is more extensive and important than its use in food. When the fruit is gathered and the nuts separated from the husks, they are kept dry till the close of winter, at which time the mucilage of the fruit has become converted into oil. The nut is cracked with a small mallet, without injuring the kernel: and the sound kernels, cleared from every particle of shell, are crushed by a millstone worked either by horse-power or water-power. The resulting paste, being enclosed in strong linen bags, is next pressed, by which oil is forced out of it. The oil which flows from the first pressure is of the best quality; it is very clear, and proper for food; but it sensibly retains the taste of the nut, which to some persons is disagreeable. In order to keep it sweet for the table, it is drawn off several times during the first few months, carefully corked, and deposited in a cool cellar. After the first expression of oil, the paste is emptied from the bags, moistened with warm water, and moderately heated in coppers; after which it is replaced in the bags, and pressed a second time, by which oil is procured more highly coloured and more likely to become rancid than the oil first obtained.

Mr. Bakewell, in his 'Travels in the Tarentaise,' gives a very interesting description of the mode of conducting these processes in Piedmont. He says that after the walnuts have been gathered, the husks removed, and the nut dried, preparations commence for taking out the kernels. "Several of the neighbouring peasants, with their wives and elder children, assembled at the château of an evening, after their work was done. The party generally consisted of about thirty persons, who were placed around a long table in the kitchen; one man sat at each end of the table, with a small mallet to crack the nuts by hitting them on the point. As fast as they are cracked, they are distributed to the other persons around the table, who take the kernels out of the shell, and remove the inner part; but they are not peeled. The peasants of Savoy are naturally lively and loquacious, and they enliven their labours with facetious stories, jokes, and noisy mirth. About ten o'clock the table is cleared to make room for the *gouté* or supper, consisting of dried fruit, vegetables, and wine; and the remainder of the evening is spent in singing and dancing, which is sometimes continued till midnight." The crushing

and pressing of the kernels take place when the whole harvest of nuts is ready.

The walnut-oil thus obtained is largely used in France as a substitute for olive-oil at the table, for almond-oil in medicine, and for whale-oil in illumination. It is also much used in the arts. Artists employ it in the preparation of white and delicate colours, for which it is preferred in France to other oils, on account of the complete and rapid manner in which it dries, and the facility with which it is obtained in a perfectly limpid state. In France, too, walnut-oil is much used in copper-plate printing, modified according to the colour of the ink, in which it is a component ingredient. It is boiled down in an iron or copper vessel, till reduced to a certain thickness, depending on the lightness or darkness of the tints to be produced. It is said that the backs of prints printed with ink containing walnut-oil do not turn yellow so soon as when other oils are employed.* When all the oil has been expressed from the kernel, the remaining 'marc,' or solid matter, is used to fatten swine and sheep, or is made into cakes for fattening poultry, or (in some districts) is made into candles, which burn with a bright and clear flame.

The husk of the nut is by no means useless, for it produces a brownish dye, as may be seen from the state of the hands in those persons who handle the green fruit. A dye is obtained from the husks thus:—When removed from the kernels, they are moistened and left to rot in a heap; after which they are boiled in a considerable quantity of water. This liquor will impart a beautiful dye to wood, darker or lighter in tint according to the proportion between the husks and the water. Sometimes the flooring of rooms is dyed by boiling the husks to a kind of paste, strewing this in a layer over the floor, and allowing it to remain till dry, by which time the wood will have imbibed the dye.

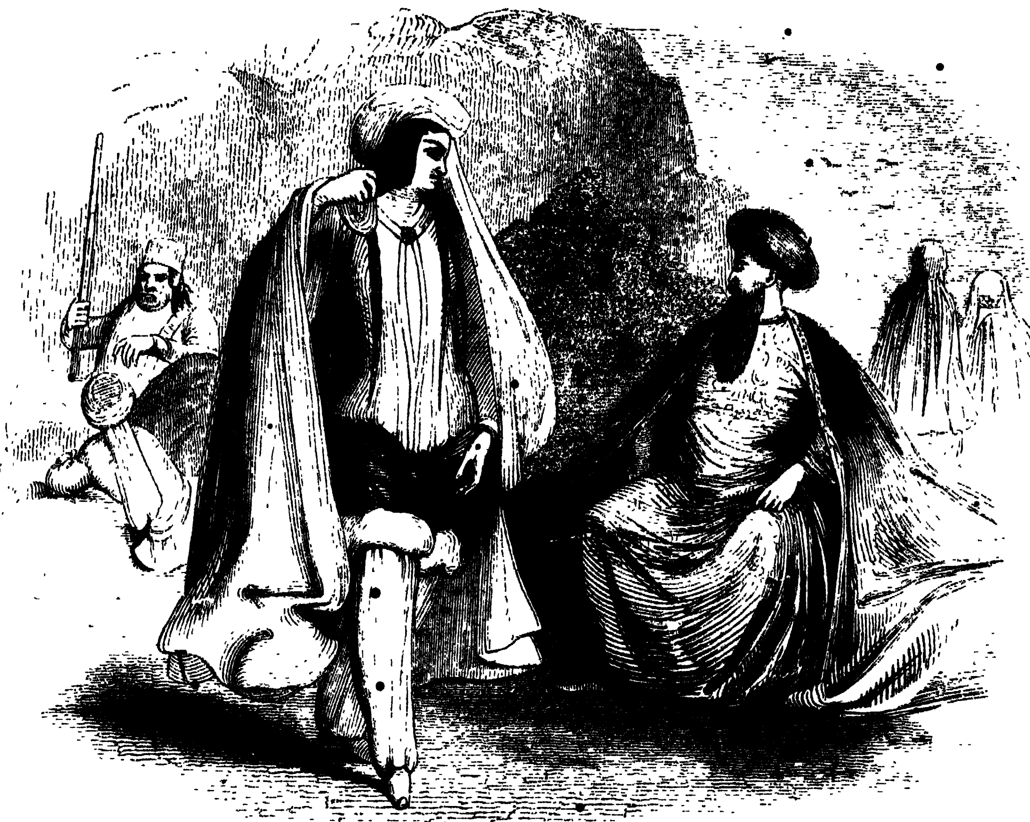
The other parts of the walnut-tree yield a few useful products. In Tartary, an incision is made in the tree in spring, when the sap is rising, and a spigot is inserted for some time; after which, on withdrawing the spigot, a clear sweet liquor flows out, which, when coagulated by evaporation, is used as sugar. In other parts of Europe and Asia, a wine is made from the sap, or a spirit distilled from it. The roots of the walnut-tree, before the rising of the sap, yield, by boiling, a dark brown dye, which may be readily applied to wood, hair, or wool; it is used by gipsies, and also by theatrical performers, to stain the skin of a deep brown. The leaves and the bark of the young shoots may also be made to yield a similar dye, by procuring the bark when the sap is in movement in spring, and by gathering the leaves when the nuts are half formed.

For fuel the wood of the walnut-tree, when dry, is considered about equal to that of the common sycamore, burning with a mild flame. As charcoal, it is not very productive. A full-sized tree, it has been stated, will yield, from burning its leaves, a quantity of potash equal to one-third the weight of the leaves themselves.

In medicine the walnut-tree is not without its uses. Gerard said that "the green and tender nuts, boyled in sugar, and eaten as suckarde, are a most pleasant and delectable meate, comfort the stomache, and expell poyson." A fine stomachic liquor is made from the young nuts about the middle of June. Pliny said that walnuts, "eaten after onions, prevent them from rising." The bark, either in a green or a dried state, and an extract obtained from the nuts, are powerfully emetic; the root is purgative and diuretic; a decoction of the wood is sudorific; the sap of the leaves is used as a horse-medicine; the vinegar in which walnuts have been pickled is used as a gargle; and various other medicinal agents are procured from different parts of the tree, adding to the number of services which it renders to man.

Mexico described by Cortes.—This city has many public squares, in which are situated the markets and other places for buying and selling. There is one square twice as large as that of the city of Salamanca, surrounded by porticos, where are daily assembled more than sixty thousand souls engaged in buying and selling; and where are found all kinds of merchandise that the world affords, embracing the necessaries of life, as for instance articles of food, as well as jewels of gold and silver, lead, brass, copper, tin, precious stones, bones, shells, snails, and feathers. There are also exposed for sale wrought and unwrought stone, bricks burnt and unburnt, timber hewn and unhewn, of different sorts. There is a street for game, where every variety of birds found in the country are sold, as fowls, partridges, quails, wild-ducks, fly-catchers, widgeons, turtle-doves, pigeons, reed-birds, parrots, sparrows, eagles, hawks, owls, and kestrels; they sell likewise the skins of some birds of prey, with their feathers, head, beak, and claws. There are also sold rabbits, hares, deer, and little dogs, which are raised for eating, and castrated. There is also an herb street, where may be obtained all sorts of roots and medicinal herbs that the country affords. There are apothecaries' shops, where prepared medicines, liquids, ointments, and plasters are sold; barbers' shops, where they wash and shave the head, and restaurateurs, that furnish food and drink at a certain price. There is also a class of men like those called in Castile porters, for carrying burdens. Wood and coals are seen in abundance, and brasiers of earthenware for burning coals: mats of various kinds for beds, others of a lighter sort for seats, and for halls and bedrooms. There are all kinds of green vegetables, especially onions, leeks, garlic, water-cresses, nasturtium, borage, sorel, artichokes, and golden-thistles; fruits also of numerous descriptions, among which are cherries and plums, similar to those in Spain; honey and wax from bees, and from the stalks of maize, which are as sweet as the sugar-cane; honey is also extracted from the plant called maguey, which is superior to sweet or new wine; from the same plant they extract sugar and wine, which they also sell. Different kinds of cotton threads of all colours in skeins are exposed for sale in one quarter of the market, which has the appearance of the silk-market at Granada, although the former is supplied more abundantly. Painters' colours, as numerous as can be found in Spain, and as fine shades; deer-skins dressed, and undressed, dyed different colours; earthenware of a large size and excellent quality; large and small jars, jugs, pots, bricks, and an endless variety of vessels, all made of fine clay, and all or most of them glazed and painted; maize, or Indian corn, in the grain and in the form of bread, preferred in the grain for its flavour to that of the other islands and terra-firma; pates of birds and fishes; great quantities of fish, fresh, salt, cooked, and uncooked; the eggs of hens, geese, and of all the other birds I have mentioned, in great abundance, and cakes made of eggs. Finally, every thing that can be found throughout the whole country is sold in the markets, comprising articles so numerous, that to avoid prolixity, and because their names are not retained in my memory or are unknown to me, I shall not attempt to enumerate them. Every kind of merchandise is sold in a particular street or quarter assigned to it exclusively, and thus the best order is preserved. They sell every thing by number or measure; at least so far we have not observed them to sell any thing by weight. There is a building in the great square that is used as an audience-house, where ten or twelve persons, who are magistrates, sit and decide all controversies that arise in the market, and order delinquents to be punished. In the same square there are other persons who go constantly about among the people observing what is sold, and the measures used in selling; and they have been seen to break measures that were not true.—*Despatches of Hernando Cortes, translated by G. Folsom.*

The Basilisk, among the ancients, was a famous kind of serpent, called a cockatrice, said to be produced from a cock's egg hatched by a serpent, and supposed to kill by its breath or sight only. The constructors of this marvel forgot to say how any one lived to tell the story. The basilisk of the moderns is merely a long-tailed lizard, living in freshwater ponds and rivers of the East India islands, and feeding on vegetables.



[Afghans.]

CITY OF CABOUL.*

In Nos. 666 and 671 the reader will find a notice of Afghanistan and its inhabitants, with a brief sketch of the policy which, in 1839, led the British government in India to send a large military force into Afghanistan. We noticed also at the same time the terrible military disaster which befel this expedition when driven from Caboul by an insurrectionary movement of the Afghans. The events by which this catastrophe has, in a military point of view, been retrieved, had not then taken place, and we will not enter into any detail about them, our object at present being to give some account of the City of Caboul.* Mr. Masson describes Caboul as situated at the western extremity of a spacious plain, in an angle formed by the approach of two ridges of hills, the interval allowing space for the stream called the River of Caboul, which is here about thirty yards wide, to flow between them. The city occupies a space of about three miles in circumference, hemmed in on three sides by mountains. Lines of ramparts and towers are carried up the sides and over the summits of the ridges, and, as Mr. Masson remarks, if they do not add much to the strength of the city, they give it a more diversified appearance. Caboul contains about nine thousand houses, and from fifty to sixty thousand inhabitants, but at certain seasons there is a great influx of strangers, and the streets, which have at all times a bustling appearance, are then particularly animated. This city is very favourably situated for commerce. The trade between India and Turkistan, whether by the Ganges or the Indus, must flow through it, from its situation at the gorge of the nearest and most practicable passes connecting the two countries.

The most striking object in the external appearance of Caboul is the Balla Hissar, built upon a hill at the south-eastern extremity of the city. It is surrounded by a wall and a wet ditch, within which is comprised about a fourth part of the city. There are two gates, one leading to the city, and the other, called the Peshawur gate, to the country; and both are closed at night. The height of the wall rises or sinks with the inclination of the ground. The lower portion is constructed of masonry to a depth of from fifteen to twenty feet, and the upper portion forms a parapet composed of burnt brick six or seven feet in height, with loopholes for large and small arms. At the south-west end of the fortification the nature of the ground has not permitted the extension of the trench, that is, the native engineers did not exert themselves to overcome the obstacle; and to strengthen this weak point a massive tower has been erected. The Balla Hissar is commanded on the south-west and west by a hill, and on the east by several eminences, and is therefore incapable of resisting a scientific attack, but in native warfare it may be regarded as a strong place. The Balla Hissar (superior fortress), or citadel, stands on the south-west side of the city of Caboul, upon a high conical hill which overlooks the whole of the city. It is separately walled round, but the ramparts, gateway, and bastions are now in ruins. The summit of the eminence on which the Balla Hissar is raised is crowned by a dilapidated square turreted building, erected for the purpose of enabling Sirdar Sultan Mahomed Khan and his friends to enjoy the beauties

* The name is variously spelled, as Cabool, Caubul, Kábal, &c.

of the landscape, which includes the distant snowy masses of the Hindu Kosh. The Balla Hissar Pahin, or lower citadel, was formerly occupied only by the sovereign and princes of his house, their servants and retainers, and the household troops. It is now tenanted much in the same way as other parts of the city, and contains nearly one thousand houses, with a good bazaar. Different quarters, or 'mallas,' are set apart for distinct classes of the population, and are called after the classes inhabiting them, as Malla Araba (Arab), Malla Habashi (descendants of Negroes), Malla Armani (Armenian), &c. The houses of Caboul are slightly and often badly built, of mud and unburnt bricks. Others, of a more substantial kind, consist of a frame-work of timber, with upright, transverse, and diagonal beams, and the intervals are filled up with mud or bricks. The roofs are flat, which is a bad arrangement where so much snow falls. After a thaw many of the mud houses fall down. The general external appearance of the houses consists of a black mud-wall; and the windows open into an interior court. Some houses, however, have little loopholes with tiny shutters towards the street. Mr. Atkinson, in his account of Afghanistan, says:—"The middle part of the city is a collection of dwellings, two and three stories high, with almost inaccessible zigzag streets, and blind alleys, a black offensive gutter creeping down the centre of the greater part of them. Walls across, with gateways, are common in all the streets, so that by closing the doors the city is divided into numerous distinct quarters of defence." The view of the city from the surrounding eminences is singularly uninteresting. Seen from the highest spot in the upper fort, it exhibits little more than a heap of mud hovels, all huddled together, with only three places at all standing out from the mass, the gaily-painted house built by Dost Mahomed Khan, and which was occupied by Sir W. M'Naughten, the envoy, when the British were at Caboul; the Royal Mosque, in ruins; and the Harem, now falling into the same condition. These are situated a few hundred yards from each other, and near the upper Balla Hissar. There are no public buildings of any pretensions; and the places of worship, though spacious and commodious, are nothing more. The fourteen or fifteen caravanserais for the accommodation of foreign merchants and traders are very inferior to the same class of buildings in Persia. The view of the city from a mountain on the westward which overshadows it is compared by Mr. Atkinson to looking down upon a stagnant pond inclosed by hills, the flat roofs of the houses resembling pieces of square plank thickly spread upon the surface.

The bazaars, the most interesting features of a city of the East, redeem Caboul from the meanness which would otherwise characterize it. They principally extend in straight lines, the Shor Bazaar being rather more than three-quarters of a mile in length, or as long as from Temple-Bar to Charing-Cross. Running irregularly parallel to it is the Bazar Derwâzi Lahori, the western portion of which is occupied by the Chahur Chatta, or four covered arcades. These arcades, of equal dimensions, are separated from each other by open squares, which at one time were provided with water and fountains. The shops are tenanted by retail dealers in woollen, cotton, and silk goods. Before the shops are counters, on which sit, with their wares displayed, makers of caps, shoes, &c. and money-changers with their heaps of copper coin. Beneath the counters are stalls generally occupied by cobblers. The shops of drapers, saddlers, braziers, ironmongers, armourers, bookbinders, &c. are found together, as in most cities in the East. There is a cattle-market daily, two grain-markets, and a fruit-market; and there are also markets for wood and charcoal, while every malla or quarter is provided with a winter depôt for fuel. No supplies of grain or other articles of chief necessity can arrive during the winter. The itinerant traders are very numerous at Caboul, each class with its peculiar cries, and amongst others is the representative of the London "old clothesman," whose cry is "Zir-i-khona? rakht-i-khona?"—"old bullion? old clothes?" The principal street of the city is ten or twelve feet broad, and this and another main street are always crowded during the day, and exhibit besides a scene of busy industry—"cooks preparing 'kabobs,' and confectioners sweetmeats; cutlers and farriers employed on guns, swords, and horseshoes; the silk-mercer, the dealer in carpets, furs, lace, chintz, saddlery, &c. all attentive to their occupations, and all in the open day." Mr. Atkinson, from whom we borrow this sketch, adds:—"The people live a good deal out of doors, and eat their meals constantly at the benches, where the cooks, a numerous class, fry their 'kabobs.' Then there are the ice-shops and 'Falooda' shops, where you see the rugged Afghan regaling on summer dainties, crunching a lump of ice, with the usual quantum of cherries, grapes, or other fruit, and a goodly portion of his brown cake of bread, everything of the kind being what is called dog-cheap." The luxurious appearance of the fruit-shops extorts the admiration of every traveller who visits Caboul, which has always been famous for its fruit. Here are to be seen melons, grapes, pears, apples, plums, peaches, in the greatest profusion, but elegantly arranged on pieces of masonry of different heights, while the shops themselves are little better than sheds. The supply of excellent vegetables is also very abundant.

Winter is a dreary season to the inhabitant of Caboul, who reposes himself upon his 'sandali,' and awaits in supine sloth the return of spring. Mr. Masson describes the 'sandali' as consisting merely of "a takht, or table, placed over a cavity in the ground, or some other receptacle to contain fire, and covered with a number of capacious cloths and quilts. A little fuel suffices to raise heat, which is retained by the quilts, and as little is necessary to sustain it. Around this sit during the day the various members of a family. Upon the surface of the 'takht' they arrange their repasts; and at night, when inclined to repose, have only to fall backwards and draw the corner of the 'sandali' over them." When the spring returns, many persons find their limbs so much cramped, that they do not recover the perfect use of them for some time. The winter is not fairly over before the beginning of April.

Gizzard Pebbles.—The real use of poultry swallowing pebbles so often along with their harder kinds of food is one of the most curious subjects in natural history. That they should have to resort to artificial means, apparently more likely to hinder than help them in grinding their food, is at the first view almost incredible. The gizzard forms their millstones, and what they can want with pebbles and gravel is a complete puzzle to philosophers. However the poultry tribe will not thrive on hard corn without; they get fat in pens, because there they have their food ready ground. "On opening the gizzard of a bird (says Roget, in his 'Bridgewater Treatise'), it is constantly found to contain a certain quantity of small pebbles, which must have been swallowed by the animal. The most natural reason that can be assigned for the presence of those stones is, that they aid the gizzard in triturating the contained food, and that they, in fact, supply the office of teeth in that operation. Both Fordyce and Hunter concur in establishing the truth of the common opinion, that in all birds possessing gizzards, the presence of the stones is essential to perfect digestion. A greater or less number of them is contained in every gizzard when the bird has been able to meet with the requisite supply, and they are never swallowed but along with the food. Several hundred were found in the gizzard of a turkey;

and two thousand in that of a goose: so great an accumulation could never have been the result of mere accident. If the alleged mistake could ever occur, we should expect it to take place to the greatest extent in those birds which are starving for want of food; but this is far from being the case. It is found that even chickens, which have been hatched by artificial heat, and which could never have been instructed by the parent, are yet guided by a natural instinct in the choice of the proper materials for food, and for assisting its digestion; and if a mixture of a large quantity of stones with a small proportion of grain be set before them, they will at once pick out the grain, and swallow along with it only the proper proportion of stones. The best proof of the utility of these substances may be derived from the experiments of Spallanzani, who ascertained that grain is not digested in the stomachs of birds when it is protected from the effects of trituration:—"Thus the gizzard may," as Hunter remarks, "be regarded as a pair of jaws whose teeth are taken in, occasionally, to assist in this internal mastication. The lower part of the gizzard consists of a thin muscular bag, of which the office is to digest the food which has just been triturated." "Stones taken into the stomachs of birds (says Bewick), are seldom known to pass with the fæces, but, being ground down and separated by the powerful action of the gizzard, are mixed with the food, and, no doubt, contribute essentially to the health of the animal." This last circumstance only makes the matter still more puzzling; that the gizzard should want the assistance of pebbles, and yet be able to grind and entirely digest such flinty substances.

Use of Brandy in Wines.—This practice, universal in the wines of Spain, Portugal, and Sicily which are intended for the English market, has also been introduced into our domestic wines, under the mistaken notion of preventing them turning sour, and with the idea that it enabled them to keep a longer time. So far from assisting in preserving the wine, it decomposes it. However slow the effects of this decomposition may appear, they are not the less certain. The first and most conspicuous effect is the loss of that undefinable lively or brisk flavour which all those who possess accuracy of taste can discover in French wines or in natural wines; and a flatness, which must be sensible, by the principle of contrast, to the dullest palate which shall compare the taste of Claret with that of Port, or that of Hock or Grave with Lisbon or Bucellas. It tends equally, although in a greater length of time, to destroy the union of the colouring principle, which is well known to be deposited in Port wines, and apparently in a great measure from the action of this foreign substance. This fact explains why dishonest wine-merchants add brandy to their Port wines, to give them earlier the appearance of age, by producing the *crust*, a criterion by which no experienced or intelligent wine-drinker allows himself to be misled. Moreover no quantity of brandy can hinder the process of acetification, if the circumstances favourable to it are present. The only effect of adding brandy is to make the vinegar stronger, not to prevent its formation. This is sufficiently proved in the process of making vinegar in Germany, by what is termed the *quick* vinegar-work, viz. by which alcohol is directly transformed into vinegar in a few hours. (Ure's *Dictionary of Arts*, 'Acetic Acid.') I have dwelt the more on this subject because this view is opposed to all popular opinions and practices, opinions most assuredly founded on erroneous and vague analogies drawn from some supposed preservative power residing in spirits. I am the more particular in calling to this subject the attention of those who may engage in the manufacture of domestic wines, because a notion is prevalent that these wines are, above all others, deficient in durability, and cannot exist without this admixture. The effect, on the contrary, is to destroy the briskness of these wines, often the only meritorious quality they possess, while it increases their expense and diminishes their salubrity. (M'Culloch, *Remarks*, p. 156.) The alcohol thus uncombined acts on the organs of the body in the same way as alcohol only diluted with an equivalent quantity of water. This is manifest even in the difference of the moral effects of unadulterated wine, in which the spirit is an integral element, and those of the coloured liquids which serve merely as a vehicle for a large portion of alcohol. The pure light wines of France and Germany produce an agreeable exhilaration of mind, very unlike the mere physical excitement, almost amounting to ferocity, which results from the largely brandied wines, which are too much in vogue in England. The diseases also which attend spirit-drinkers, chiefly disorders of the liver, are commonly met with among the consumers of wines to which brandy or whiskey has been adventitiously added, though such disorders rarely, if ever, follow even the intemperate use of pure wine. Much therefore of the ill-health supposed to follow the habitual use of wine must be attributed to the alcohol with which they are adulterated, not to the wine itself. As the domestic wines, whether obtained from the *makers of sweets*, or prepared at home, have the largest quantity of alcohol adventitiously mixed with them, often to the amount of a fourth, or even a third, it is most important that the facts above stated should be known to the consumers of them, more particularly to females, who frequently imagine that they are taking something less objectionable in preferring these to the wines used by men. The light wines of France, of the Rhine, the Moselle, of the Amontillado and Manzanilla of Spain, to which brandy is not added, are much to be commended, as more wholesome, and not very much more expensive: at all events the health would gain where the purse suffers.—*Penny Cyclopædia.*

Vegetable Ivory.—There is an article now coming into general use, called vegetable ivory, concerning which we have had so many inquiries that we shall probably be gratifying our readers by a more particular account of it than we can give in the notices to correspondents. The ivory nut is the produce of a tree found on the banks of the river Magdalena, in that part of South America formerly called New Granada, but now constituting the republic of Columbia. Humboldt and Bonpland found it at places called Barancas Vermejas and Ibague, at the foot of Mount Quindiu, and also on the Rio Opon and Caño de Chucuri. The Spanish botanists Ruiz and Pavon also met with it in the groves of Peru in the hotter parts of the Andes, and named it Phytelephas macrocarpa; the Prussian botanist Wildenow changed the name, without sufficient reason, to Elephantusia macrocarpa, but his bad example is not followed. The natives of Columbia call it Tagua, or Cabeza de Negro (Negro's head), in allusion, we presume, to the figure of the nut. Almost all we know about it is contained in the following memorandum, published by the Spanish writers above mentioned:—"The Indians cover their cottages with the leaves of this most beautiful Palm. The fruit at first contains a clear insipid fluid, by which travellers allay their thirst; afterwards this same liquor becomes milky and sweet, and it changes its taste by degrees as it acquires solidity, till at last it is almost as hard as ivory. The liquor contained in the young fruits becomes acid if they are cut from the tree and kept some time. From the kernels the Indians fashion the knobs of walking-sticks, the reels of spindles, and little toys, which are whiter than ivory, and as hard, if they are not put under water; and if they are, they become white and hard again when dried. Bears devour the young fruit with avidity." The tree which furnishes these nuts is a Palm, although Humboldt and Kunth have referred it, for some reason with which we are unacquainted, to the order of Screw Pines (Pandanaceæ), an error which is preserved by all botanists up to the present day. Two species are known, the *Phytelephas macrocarpa*, or large-fruited, and *microcarpa*, or small-fruited. The part of the kernel which is thus similar to ivory is what is called the albumen; that is to say, the nutritious substance which surrounds the embryo, and which is destined to feed it when it begins to grow. It is of the same nature, though not of the same consistence, as the flour of corn, the spicy substance of the nutmeg, and the meat of the cocoa-nut, which in other Palm-trees becomes very hard; that of the Date-Palm is quite as hard, if not harder: but it is not white enough or large enough to be worth using by the turner. The Doum Palm, or Forking Palm, of Thebes, the fruits of which are called gingerbread-nuts at Alexandria, has a similar albumen, which is turned into beads for rosaries; and our correspondent Mr. Murray informs us that he has a model of the Double Cocoa-nut, or Coco de Mer, beautifully carved from a portion of its own albumen, as hard as ivory, and susceptible of as fine a polish. He says he has also seen a figure cut from the same specimen, forming the end of the shaft of a lady's parasol, not to be discriminated from one carved in ivory. —*Gardeners' Chronicle.*

The Salamander, the fabled daughter of fire in former times, has now dwindled down into a harmless lizard. Such is the sad work which our modern naturalists, sworn enemies of all fictions but their own, have made with the ingenious and brilliant fabrications of antiquity. It is almost unnecessary to repeat now, that there is not the slightest foundation for the story of this animal being able to resist the action of fire.



[Lord Mayor's Show.—From Hogarth.]

THE LORD MAYOR'S SHOW.

[Abridged from 'London.']

A LOVE of sight-seeing was a characteristic feature in our forefathers; and the remark made by Trinculo, in 'The Tempest,' that "when they will not give a doit to a lame beggar, they will lay out ten to see a dead Indian," was a most truthful saying. This feeling generated the frequent display of pageantry on public occasions, more particularly when the mayor of London was installed in his office, an event anciently commemorated with a degree of pomp of which spectators of a modern "Lord Mayor's Show" can form but little conception, and which was intimately associated with the office in the eyes of the ancient citizens. These *Ridings*, as they were termed, occurred so often also on the public entries into London of our kings or their consorts, or of foreign potentates and ambassadors, that they became matters of constant expectation with the gayer classes, and were ardently looked forward to by the city apprentices as an excuse for a holiday. Chaucer, speaking of the gay apprentice, "Perkin Revelour," says that

> "when there any riding was in Chepe,
> Out of the shoppe thider wold he lepe:
> And till that he had all the sight yseen
> And danced well, he would not come agen."

The origin of these ridings may be traced to the early part of the thirteenth century; for when King John, in the year 1215, first granted a mayor to the city of London, it was stipulated that he should be presented for approval either to the king or his justice. From this originated the procession to Westminster, where the king's palace was situated; and as the judges also sat there, it was necessary for the citizens in either instance to repair thither, which they did annually, on horseback. A water-procession, however, came into vogue earlier than is generally imagined: the accounts of the Grocers' Company for the year 1436 contain items of expenditure for "hiring of barges" for such water-processions nineteen years before the date of their supposed introduction by Sir John Norman, who is lauded by the City laureate, Middleton, in his pageant for 1621, called the 'Sun in Aries,' as "the first lord mayor that was rowed to Westminster with silver oars at his own cost and charges.

Although the old chroniclers have left us a pretty complete series of descriptions of royal entertainments and processions through the City, we meet with nothing that will inform us of what the lord mayor's own pageantry consisted, as exhibited in his honour on the day of his entrance upon the duties of his office, until the year 1533, when the unfortunate Anne Boleyn came from Greenwich to Westminster, on the day of her coronation; the mayor and citizens having been invited by Henry to fetch Anne from Greenwich to the Tower, and "to see the citie ordered and garnished with pageauntes in places accustomed, for the honour of her Grace," which was accordingly performed as they used to do when the mayor is presented at Westminster, on the morrow after Simon and Jude.* The following is the description given by Hall of the barges of the mayor and company:—"First, before the mayor's barge was a foist or wafter† full of ordnance, in which was a great dragon continually moving and casting wild fire, and rounde about stood terrible monsters and wild men casting fire and making hideous noises:" this vessel served to clear the way for the mayor's barge, which "was garnished with many goodly banners and streamers, and richly covered; in which barge were shalmes, shagbushes, and divers other instruments, which continually made goodly harmony. Next after the mayor followed his fellowship, the Haberdashers, next after them the Mercers, then the Grocers, and so every company in his order; and, last of all, the mayor's and sheriffs' officers, every company having melody in his barge by himself, and goodly garnished with banners, and some garnished with silk, and some with arras and rich carpets; and in that order they rowed downward to Greenwich towne, and there cast anchor, making great melody."

Among the pageants exhibited upon land on the day of the lord mayor's "inauguration," one was generally introduced, if possible, in punning allusion to the name of the mayor. In 1415 John Wells, of the Grocers' Company, was mayor, and three *wells* running with wine were exhibited at the conduit in Cheapside, attended by three virgins to personate Mercy, Grace, and Pity, who gave of the wine to all comers: these

* The 29th of October, the regular Lord Mayor's Day, until the alteration of the style, in 1752.

† A barge or pinnace propelled by rowers.

wells were surrounded with trees laden with oranges, almonds, lemons, dates, &c., in allusion to his trade as a grocer. In the same way Peele's pageant of 1591, 'Descensus Astrææ,' which was written for the mayoralty of William Web, contained a similar allusion: for "in the hinder part of the pageant did sit a child, representing Nature, holding in her hand a distaff, and *spinning a web* which passeth through the hand of Fortune, and is wheeled up by time."

The earliest notices of pageants exhibited on lord mayor's day hitherto discovered, are the entries from the Drapers' books, quoted by Herbert in his 'History of the Livery Companies,' where an entry for 13*l.* 4*s.* 7*d.* occurs for Sir Laurence Aylmer's pageant, in 1510. When Sir William Draper was mayor, in 1566-7, a pageant was exhibited in which six boys were placed, who sung and pronounced speeches: in the procession appeared forty-six bachelors in gowns furred with foins,* and crimson satin hoods; twenty-eight whifflers to clear the way; forty-eight men bearing wax torches an ell in length, and the same number armed with javelins. Two 'woodmen' or savages carried clubs and hurled squibs to clear the way for the procession. They were constant precursors of pageants in the olden time, and are frequently alluded to by the old dramatists and authors of popular literature; and as late as 1686 "twenty savages, or green men, walked with squibs and fire-works, to sweep the streets and keep off the crowd" before the principal pageant. The representation here given of these wild-men with their clubs and green men hurling their fire-works, are copied from Bate's 'Book of Fireworks' (1635) and other contemporary sources.



William Smythe, citizen and haberdasher, of London, penned, for the benefit of posterity, in the year 1575, 'A Breffe Description of the Royall Citie of London,' in which the best detailed account of the mayoralty-shows during the reign of the Virgin Queen is to be met with. The water-procession consisted of the mayor's barge, wherein he sat with all the aldermen, near which "goeth a shyppbote, of the Queen's Majesties, being trymmed up, and rigged like a shippe of war, with dyvers peeces of ordinance, standards, pennons, and targets of the proper armes of the sayd Mayor, the armes of the citie, of this company," &c., before which goes the barge of his own company, with the bachelors barge, "and so all the companies in London, in order, every one havinge their own proper barge, garnished with the armes of their company." On their return from Westminster they land at Paul's Wharf, "when the mayor and aldermen take their horses, and in great pompe passe through the greate street of the citie, called Cheapside." The procession is opened by "certain men apparelled like devils, and wylde men with squibs." Then come standards, emblazoned with the armes of the city and the mayor, drummers, fifers, and about "seventy or eighty poore men marchinge two and two together, in blewe gownes, with redd sleeves, and capps, every one bearing a pike and a targett, whereon is paynted the armes of all them that have been mayor, of the same company that this new mayor is of." These are followed by other banner-bearers, musicians and whifflers; "then the pageant of tryumph, rychly decked, whereuppon, by certayne figures and wrytinges (partly touchyng the name of the sayd mayor), some matter touching justice and the office of a magistrate is represented." Then come trumpeters, "and certayne whifflers, in velvet cotes, and chaynes of golde, with white staves in their hands, to clear the way, followed by the bachelors of the mayor's company, and the waytes of the citie in blewe gownes, red sleeves and cappes, every one havinge his silver collar about his neck." Afterwards come the livery and the great officers of the city, followed by the lord mayor, attended by his sword and mace bearer, with whom ride the old mayor. Behind them come the aldermen two and two together, the procession being closed by the two sheriffs.

The whifflers, who played so important a part in the show, were young freemen who marched at the head of their proper companies to clear the way. Among the collection of prints and title-pages formed by John Bagford, and now placed in the British Museum, are two very curious ones which are here copied. They bear date 1635, and represent a whiffler with his "staff and chain," and the lord mayor's bench-boy, as decorated for attendance with a gold chain and a staff having a bunch of flowers at top covered by a lace handkerchief tied in a knot round the stems and flowing below. These pages to the mayor derived their name, says Blackstone, from following the *haunch* of their masters, and thence being called *haunch-boys*, or *henchboys*. The reader will remember the quarrel between Oberon and Titania in the 'Midsummer Night's Dream' concerning the little changeling boy the King of Fairies wished to make "his hench-man."



* Foins, bachelors and budge bachelors are frequently mentioned in all old accounts of civic pageantry; they obtained their names from the furs with which their gowns were trimmed. Foins is the skin of the marten; budge is lamb-skin with the wool dressed outwards.

During the reign of James I. the display of pageantry on Lord Mayor's Day considerably increased, both on land and water, for it was not uncommon to place sea-chariots, with Neptune and other characters in them, upon the Thames, to address the mayor before going to Westminster. Middleton's pageant, 'The Triumphs of Truth,' 1613, describes "five islands, artfully garnished with all manner of Indian fruit-trees, drugges, spiceries, and the like; the middle island having a faire castle, especially beautified," the whole intended as an emblem of the Grocers' Company (of which body the mayor was a member), their East Indian trade, and recently-erected forts there. These islands, upon his return, figure in the show by land, being placed on wheels, and having one of the five senses (personated by children) seated on each of them. The other pageants exhibited on this occasion, and the various impersonations displayed, had all some reference to morality and good government. Thus the first character who attends at Baynard's Castle to receive the mayor on his return from Westminster is Truth's attendant angel, accompanied by his champion, Zeal, who conduct him to Paul's Chain, where they are met by Envy and Error in a triumphant chariot, who propose to the mayor to—

> "Join together both in state and triumph,
> And down with beggarly and friendless Virtue,
> That hath so long impoverish'd this fair city."

They are, however, put to flight for a time by Truth, who approaches in her chariot, and conducts the mayor to "London's Triumphant Mount," the great feature of the day's show. It is veiled by a fog or mist, cast over it by Error's disciples, Barbarism, Ignorance, Impudence, and Falsehood, four monsters with clubs, who sit at each corner. At the command of Truth, "the mists vanish and give way; the cloud suddenly rises, and changes into a bright spreading canopy, stuck thick with stars, and beams of gold shooting forth round about it." In the midst sits London, attended by Religion, Liberality, Perfect Love, Knowledge, and Modesty; while at the back sit Chastity, Fame, Simplicity, and Meekness. After a speech from London, "the whole triumph moves in richest glory towards the Cross in Cheap," where Error again causes his mist to enshroud it, which is again removed by Truth, a manœuvre of the machinist which is frequently repeated during the passage to Guildhall and back to the service at St. Paul's, where it was always customary for the mayor to attend after dinner, going in full procession with all the pageants; and when service was over, he retired to his own house, where farewell speeches were addressed to him, in this instance, by London and Truth; Zeal, at the command of the latter, finishing the day's show by shooting a flame at the chariot of Error, which sets it on fire, and all the beasts that are joined to it.

[To be continued.]

PROGRESSES OF QUEEN ELIZABETH.—XII.

1591—1592.

Cowdray, Elvetham, Rycot, &c.

On the 15th of August Queen Elizabeth left Farnham for Cowdray, where she was sumptuously entertained by the Lord Montague, and remained till the 21st. She arrived there about eight at night; her first appearance was hailed by loud music, which at her entrance suddenly ceased, while a personage in armour, standing between two porters carved in wood, received her with a speech in which he said "it was a prophecy since the first stone was laid, that these walls should shake, and the roof totter, till the wisest, the fairest, and most fortunate of all creatures should, by her first step, make the foundations staid, and by the glance of her eyes make the turret steady;' that his fellow-porters, "thinking there could be none so noble, fell on sleep. . . . . Mark, how they look, more like posts than porters, retaining only their shapes, but deprived of senses. . . . . And now it is: for the music is at an end, this house immoveable, your virtue immortal. O miracle of time, nature's glory, fortune's empress, the world's wonder!" In the course of the following days she was entertained by similar addresses from a pilgrim, a wild man, and an angler. On the 20th she "dined in the privy walks in the garden, and the lords and ladies at a table forty-eight yards long. In the evening the country-people presented themselves to her Majesty in a pleasant dance, with tabor and pipe, and the Lord Montague and his lady among them, to the great pleasure of all the beholders, and gentle applause of her Majesty." On the 21st she left for Chichester. Cowdray is now, and has long been, a deserted ruin.

At Chichester she remained some days, but the account of her reception has been lost. Thence she proceeded by Petworth and Stanstead to Portsmouth, to which place ale was sent from Guildford for her use. Thence to Titchfield House, the seat of the Earl of Southampton, and then to the town of Southampton, where also ale was sent from Guildford: were Southampton and Portsmouth unable to produce ale sufficiently good for her drinking? or was Guildford celebrated for its ale, as Alton is now? On the 13th of September she was at Sir Henry Wallop's, at Farley near Basing; and on the 20th at Odiham, at both of which places she was magnificently entertained, but there are no records of the proceedings.

On the same day, the 20th, she arrived at Elvetham, the seat of the Earl of Hertford, who received her "with his train well mounted, to the number of two hundred and upwards, and most of them wearing chains of gold about their necks." But as Elvetham was "none of the earl's chief mansion-houses," he had had to make preparations for her reception. "First, there was made a room of estate for the nobles, and at the end thereof a withdrawing place for her Majesty. The outsides of the walls were all covered with boughs and clusters of ripe hazel-nuts, the insides with arras, the roof of the place with works of ivy-leaves, the floor with sweet herbs and green rushes. Near adjoining unto this were many offices new built, as namely, spicery, larder, chaundry, wine-cellar, ewry, and pantry, all of which were tiled. Not far off was erected a large hall, for the entertainment of knights, ladies, and gentlemen of chief account. There was also a several place for her Majesty's footmen and their friends. Then was there a long bower for her Majesty's guards; another for other servants of her Majesty's house; another for my lord's steward, to keep his table in; another for his gentlemen that waited. Most of these foresaid rooms were furnished with tables, and the tables carried twenty-three yards in length. Moreover on the same hill, there was risen a great common buttery; a kitchen-house; a large pastry with five ovens new built, some of them fourteen feet deep; a great kitchen, with four ranges, and a boiling-place for small boiled meats; another kitchen with a very long range, for the waste, to serve all comers; a boiling-house for the great boiler; a room for the scullery; another room for the cook's lodging. Some of these were covered with canvas, and other some with boards. Between the earl's house and foresaid hill, where these rooms were raised, there had been made in the bottom, by handy labour, a goodly pond, cut to the perfect figure of a half-moon. In this pond were three notable grounds,

where hence to present her Majesty with sports and pastimes. The first was a ship isle of a hundred feet in length and fourscore feet broad, bearing three trees orderly set for three masts; the second was a fort, twenty feet every way, and overgrown with willows; the third and last was a small mount, rising to four circles of green privet hedges, the whole in height twenty feet, and forty feet broad at the bottom. These three places were equally distant from the side of the pond, and every one by a just measured proportion distant from the other. In the said water were divers boats prepared for music, but especially there was a pinnace full furnished with masts, yards, sails, anchors, cables, and all other the ordinary tackling, and with iron pieces, and lastly with flags, streamers, and pendants, to the number of twelve, all painted with divers colours and sundry devices."

On entering Elvetham Park she was received by a poet with a long address in Latin verse, and while he was pronouncing it, "six virgins were behind him, busily removing blocks out of her Majesty's way; which blocks were supposed to be laid there by the person of Envy, whose condition is to envy at every good thing, but especially to malice the proceedings of Virtue, and the glory of true Majesty." These virgins represented the three Graces and three Hours; they were attired in gowns of taffeta sarsenet of various colours, with garlands of flowers on their heads, and baskets of sweet herbs and flowers on their arms. They preceded her Majesty to the house, strewing the way with flowers, and singing "a sweet song of six parts" as they walked along. Four days were occupied with similar entertainments; on the last day the Fairy Queen and her attendants brought a garland "in the form of an imperial crown," with an address and dancing. The following was the closing song "of six parts," with the music of an excellent concert; wherein was the lute, bandora, bass-viol, cittern, treble-viol, and flute:"—

"Eliza is the fairest Queen
That ever trod upon this green.
Eliza's eyes are blessed stars,
Inducing peace, subduing wars.
Eliza's hand is crystal bright,
Her words are balm, her looks are light;
Eliza's breast is that fair hill,
Where virtue dwells, and sacred skill.
O blessed be each day and hour,
Where sweet Eliza builds her bower."

This so delighted her Majesty, that "she commanded to hear it sung and to be danced three times over;" dismissing the actors "with thanks, and with a gracious largess," and this although it rained heavily. She then immediately took her departure, all the actors in the different entertainments attending on her, wringing their hands, and showing signs of sorrow for her departure; the poet making her a farewell address, and the following song being sung at the gate, to hear which her Majesty, "notwithstanding the heavy rain, stayed her coach, and pulled off her mask, giving great thanks:"—

"Come again, fair Nature's treasure,
Whose looks yield joys exceeding measure.
Come again, world's star-bright eye,
Whose presence beautifies the sky.
Come again, world's chief delight,
Whose absence makes eternal night.
Come again, sweet lively sun;
When thou art gone, our joys are done.

"O come again, fair Nature's treasure,
Whose looks yield joys exceeding measure.
O come again, world's chief delight,
Thine absence makes eternal night.
O come again, world's star-bright eye,
Whose presence doth adorn the sky.
O come again, sweet beauty's sun.
When thou art gone, our joys are done."

Though the flattery is sufficiently vehement, the grossness is certainly much redeemed by the elegance and fancy of the poetical medium by which it was administered.

On the 24th the Queen was again at Farnham Castle; on the 26th, at Sutton Place, the seat of Sir Richard Weston; returning thence to her own palace at Richmond. But in the beginning of November she was at Southwick, in Hampshire, with Monsieur Beauvoir, the ambassador, and Monsieur de Reaux, the envoy, from Henry IV. of France; and on the 13th she visited the Bishop of Ely, in Ely Place, London.

In 1592 the Queen paid a few visits in the neighbourhood of London, but her first Progress was not till August, when she proceeded to Bisham Abbey, a retired but pleasantly situated residence in Berkshire, near the Thames, opposite to Marlow. It had been previously a richly endowed establishment for Augustine canons, but suppressed by Henry VIII., and, after some changes, was now the property of Sir Edward Hoby, who, with his mother (a daughter of Sir Anthony Cooke, and again a widow, her second husband, John, Lord Russel, having died in 1584), now resided here. The Queen's reception was as warm and complimentary as usual. The following curious entries referring to it are from the churchwarden's books of the adjacent parish of Marlow:—

	s.	d.
"Item, paid John Black for mending the bells when the Queen came to Bisham .	1	6
"Item, paid for nails and drink the same time	1	0
"Item, received of players for playing in the church-loft	2	0
"Item, paid to one for the carriage of the morris-coats to Maidenhead .	0	4"

Were the players of Marlow so ambitious of becoming court musicians that they were willing to pay two shillings for the opportunity of exhibiting before the Queen in Marlow church? or were the Marlow players lent, "for a consideration," to Bisham church? for there were but few attractions to draw her thence to Marlow. The "morris-coats" (garments hung with bells for the morris-dancers) were probably sent to Maidenhead for the players to exhibit before the Queen, either on her progress to Bisham or on her departure; most likely on her arrival, for the recorder of this visit, Mr. Edward Jones, secretary to the lord keeper, says, "at the top of the hill going to Bissam" a wild man came forth and addressed her in a speech. Bisham lies in a valley beneath the hill over which the road leads to Maidenhead, and she in all likelihood went through Marlow on her departure, as in the same month (August) we find her visiting Sir Henry Lee at Quarrendon near Aylesbury.

Sir Edward Hoby was eminent as a parliamentary speaker, not undistinguished as a writer in controversial divinity, and the friend and patron of the learned Camden, who dedicated to him his 'Hibernia;' his mother had written Greek and Latin verses on her husband and son, and other verses preserved by Fuller; and yet the following is a specimen of what was deemed best suited to the Queen's taste, to which they were content to administer. Midway on the hill, after leaving the wild man, were "Pan and two Virgins keeping sheep," and after some conversation as to the worthlessness of men's love, one of the virgins thus informs Pan of her Majesty's arrival:—

"This way cometh the Queen of this island, the wonder of the world, and nature's glory, leading affections in fetters, virginity's slaves: embracing mildness with justice, Majesty's twins. In whom nature hath imprinted beauty, not art painted it; in whom wit hath bred learning, but not without labour; labour brought forth wisdom, but not without wonder. By her it is (Pan) that all our carts that thou seest are laden with corn, when in other countries they are filled with harness (armour); that our horses are led with a whip, theirs with a lance; that our rivers flow with fish, theirs with blood: our cattle feed on pastures, they feed on pastures like cattle. One hand she stretcheth towards France, to weaken rebels; the other to Flanders, to strengthen religion: her heart to both countries, her virtues to all. This is she at whom envy hath shot all her arrows; and now for anger brake her bow; on whom God hath laid all his blessings, and we for joy clap our hands. Heedless Treason goeth headless, and close treachery restless. Danger looketh pale to behold her majesty; and Tyranny blusheth to hear of her mercy. Jupiter came into the house of poor Baucis, and she vouchsafeth to visit the base farms of her subjects. We, upon our knees, will entreat her to come into the valley, that our houses may be blessed with her presence, whose hearts are filled with quietness by her government. To her we wish as many years as our fields have ears of corn, both infinite; and to her enemies, as many troubles as the wood hath leaves, all intolerable."

In the same month, as we have already mentioned, the Queen spent two days at Quarendon, and here also were exhibited masques for her entertainment, contrived to assure her of the unbounded devotion of the brave old knight to her person and service. The latter part consisted of a narrative, by a character representing a chaplain, of the sickness, recovery, and at length the apparent death of a knight devoted to the Queen, and concluding with his will. The Queen's arrival recovers the knight from his trance, but he confirms the will and legacy. The legacy is certainly a singular collection of fantastic conceits.

"Item, I bequeath to your Highness *the whole Manor of Love*, and the appurtenances thereunto belonging, viz.:—

> "Woods of high attempts,
> Groves of humble service,
> Meadows of green thoughts
> Pastures of feeding fancies,
> Arable land of large promises,
> Rivers of ebbing and flowing favours,
> Fishing for dainty kisses with smiling countenances,
> Hawking to spring pleasures with the spaniels of kindness,
> Hunting that dear game which repentance followeth;"

with many more, which, if not felt to be tedious then, we fear could not fail to be so now, and we therefore refrain.

On the 4th September the Queen was in Bath, and at this time also she visited her godson Sir John Harrington, at his house at Kilweston. Thence she proceeded to Gloucestershire, where she first visited and knighted John Higford of Alderton; but the object of her progress was Sudeley Castle, where she was magnificently entertained by Giles, Lord Chandos. Masques, speeches, verses, and songs were provided for her amusement, but offer nothing peculiar for selection. She remained several days at Sudeley, arriving on the 12th; on leaving Sudeley she proceeded to Oxford, which she reached on the 22nd, staying, however, a day or two at Woodstock. Of her reception at Oxford an account is given in page 147. On the 28th she left Oxford, for Rycot, the seat of Lord Norreys, now the property of his descendant the Earl of Abingdon. Here she was received by an "old gentleman, sometime a soldier," with a speech, in which he said, "My horse, my armour, my shield, my sword, the riches of a young soldier, and an old soldier's reliques, I should here offer to your Highness; but my four boys have stolen them from me, vowing themselves to arms, and leaving me to my prayers. . . . This is their resolution, and my desire, that their lives be employed wholly in your service, and their deaths be their vow's sacrifice." This is a compliment very happily expressed. The old man's speech concludes: "Vouchsafe this trifle (a fair gown); and with this my heart, the greatest gift I can offer, and the chiefest that I ought." On the Sunday four messengers from the four sons are represented as arriving, bringing letters and presents. The first from Ireland, with a dart of gold, set with diamonds, and the motto, in Irish, "I fly only for my sovereign." The second messenger brought a key from Flanders, with this motto in Dutch, "I only open to you." The third letter inclosed a sword from France, with the motto in French, "Drawn only in your defence;" and the fourth from Spain, with a truncheon, and the Spanish motto, "I do not command but under you." The presents were all of gold, like the first, and set with diamonds and rubies. There is nothing to notice in the letters. On her departure a messenger from Jersey presented her with a daisy of gold set with rubies, bidding her farewell. This was her last Progress during the year.

Swallows.—In no part of natural history has there been a more absurd or generally received opinion than that of swallows wintering in the mud. It was the Norway bishop Pontoppidan who first set that notion afloat in the world, and he only reported it from the fishermen, who assured him that they frequently drew up great bunches of swallows from the bottom of the lakes there. The swallow leaves the green meadows of England in autumn, for the myrtle and orange groves of Italy, and for the palms of Africa. Swallows have been seen crossing the Mediterranean in autumn towards the African shores. The celerity with which they fly renders any exploit by them on the wing credible enough. The flight of birds generally may be estimated at from fifty to one hundred and twenty miles an hour. It is remarkable that all migratory birds, when detained in captivity, manifest great agitation when the period of their migration arrives, in so much that some of them, the quail in particular, occasionally kill themselves in their efforts to escape. This agitation is always greatest at night, proving, together with observation, that birds generally commence their flight at that time. The swallow lives no longer under water than other birds, that is, a few minutes; and yet there are plenty of people, and some even of great names as naturalists, who, in spite of that fact, will still perversely believe that swallows winter in the mud at the bottom of ponds and rivers, and all because we do not happen to know the precise kinds of latitude in Africa where they go to. They might with as much probability say the same of any other migratory bird; but then they have the authority of celebrated men for ages, from Pontoppidan down to Derham and Linnæus, and above all the great Cuvier. Not one of these authors had ever seen a swallow that had been drawn from the mud; and in Germany, once, a reward of an equal weight in silver was publicly offered to any one who should produce swallows found under water; but, as Frisch informs us, nobody ever claimed the money. Notwithstanding that, Mudie says that persons of great probity made asseverations and affidavits of the fact, and the friends of the laborious and accurate Reaumur promised that they would send him the identical birds that had wintered under the ice, but somehow or other not one of them ever kept their word with him, and when they were pressed, it turned out that, like the beholders of ghosts, they had not actually seen them themselves, but had been assured of the fact by other eye-witnesses, who were every way as worthy of credit. Our own able anatomist, John Hunter, says, he esteems it a very wild opinion, that terrestrial animals can remain any long time under water without drowning, and that their internal anatomy is wholly different from that of the frog and other amphibious animals.



SIR ROGER DE COVERLEY.—No. X.

We give the 'Spectator,' No. 335, without abridgment. It is by Addison.

"My friend Sir Roger de Coverley, when we last met together at the club, told me that he had a great mind to see the new tragedy ('The Distressed Mother') with me, assuring me at the same time that he had not been at a play these twenty years. 'The last I saw,' said Sir Roger, 'was the 'Committee,' which I should not have gone to neither had not I been told beforehand that it was a good Church of England comedy.' He then proceeded to inquire of me who this distressed mother was; and upon hearing that she was Hector's widow, he told me that her husband was a brave man, and that when he was a school-boy he had read his life at the end of the dictionary. My friend asked me in the next place if there would not be some danger in coming home late, in case the Mohocks should be abroad. 'I assure you,' says he, 'I thought I had fallen into their hands last night; for I observed two or three lusty black men that followed me half way up Fleet Street, and mended their pace behind me in proportion as I put on to get away from them. You must know,' continued the knight with a smile, 'I fancied they had a mind to hunt me; for I remember an honest gentleman in my neighbourhood who was served such a trick in King Charles the Second's time, for which reason he has not ventured himself in town ever since. I might have shown them very good sport had this

been their design; for, as I am an old fox-hunter, I should have turned and dodged, and have played them a thousand tricks they had never seen in their lives before.' Sir Roger added, that 'if these gentlemen had any such intention, they did not succeed very well in it; for I threw them out,' says he, 'at the end of Norfolk Street, where I doubled the corner, and got shelter in my lodgings before they could imagine what was become of me. However,' says the knight, 'if Captain Sentry will make one with us to-morrow night, and you will both of you call upon me about four o'clock, that we may be at the house before it is full, I will have my own coach in readiness to attend you, for John tells me he has got the fore-wheels mended.'

"The captain, who did not fail to meet me there at the appointed hour, bid Sir Roger fear nothing, for that he had put on the same sword which he made use of at the battle of Steenkirk. Sir Roger's servants, and among the rest my old friend the butler, had, I found, provided themselves with good oaken plants, to attend their master upon this occasion. When we had placed him in his coach, with myself at his left hand, the captain before him, and his butler at the head of his footmen in the rear, we conveyed him in safety to the playhouse, where, after having marched up the entry in good order, the captain and I went in with him, and seated him betwixt us in the pit. As soon as the house was full and the candles lighted, my old friend stood up and looked about him with that pleasure which a mind seasoned with humanity naturally feels in itself at the sight of a multitude of people who seem pleased with one another, and partake of the same common entertainment. I could not but fancy to myself, as the old man stood up in the middle of the pit, that he made a very proper centre to a tragic audience. Upon the entering of Pyrrhus, the knight told me that he did not believe the King of France himself had a better strut. I was indeed very attentive to my old friend's remarks, because I looked upon them as a piece of natural criticism, and was well pleased to hear him, at the conclusion of almost every scene, telling me that he could not imagine how the play would end. One while he appeared much concerned for Andromache; and a little while after as much for Hermione; and was extremely puzzled to think what would become of Pyrrhus.

"When Sir Roger saw Andromache's obstinate refusal to her lover's importunities, he whispered me in the ear, that he was sure she would never have him; to which he added, with a more than ordinary vehemence, 'You can't imagine, Sir, what it is to have to do with a widow.' Upon Pyrrhus his threatening to leave her, the knight shook his head, and muttered to himself, 'Ay, do if you can.' This part dwelt so much upon my friend's imagination, that at the close of the third act, as I was thinking on something else, he whispered me in my ear, 'These widows, Sir, are the most perverse creatures in the world. But pray,' says he, 'you that are a critic, is the play according to your dramatic rules, as you call them? Should your people in tragedy always talk to be understood? Why, there is not a single sentence in this play that I do not know the meaning of.'

"The fourth act very luckily began before I had time to give the old gentleman an answer. 'Well,' says the knight, sitting down with great satisfaction, 'I suppose we are now to see Hector's ghost.' He then renewed his attention, and, from time to time, fell a-praising the widow. He made, indeed, a little mistake as to one of her pages, whom, at his first entering, he took for Astyanax; but quickly set himself right in that particular, though, at the same time, he owned he should have been glad to have seen the little boy, who, says he, must needs be a very fine child by the account that is given of him. Upon Hermione's going off with a menace to Pyrrhus, the audience gave a loud clap, to which Sir Roger added, 'On my word, a notable young baggage.'

"As there was a very remarkable silence and stillness in the audience during the whole action, it was natural for them to take the opportunity of the intervals between the acts to express their opinion of the players, and of their respective parts. Sir Roger, hearing a cluster of them praise Orestes, struck in with them, and told him that he thought his friend Pylades was a very sensible man. As they were afterward applauding Pyrrhus, Sir Roger put in a second time: 'And let me tell you,' says he, 'though he speaks but little, I like the old fellow in whiskers as well as any of them.' Captain Sentry, seeing two or three wags who sat near us lean with an attentive ear towards Sir Roger, and fearing lest they should smoke the knight, plucked him by the elbow, and whispered something in his ear that lasted till the opening of the fifth act. The knight was wonderfully attentive to the account which Orestes gives of Pyrrhus's death, and, at the conclusion of it, told me it was such a bloody piece of work that he was glad it was not done upon the stage. Seeing afterwards Orestes in his raving fit, he grew more than ordinarily serious, and took occasion to moralize (in his way) upon an evil conscience, adding, that Orestes in his madness looked as if he saw something.

"As we were the first that came into the house, so we were the last that went out of it, being resolved to have a clear passage for our old friend, whom we did not care to venture among the justling of the crowd. Sir Roger went out fully satisfied with his entertainment, and we guarded him to his lodging in the same manner that we brought him to the playhouse, being highly pleased for my own part, not only with the performance of the excellent piece which had been presented, but with the satisfaction which it had given to the good old man."

LIVING ON THE ALPINE GLACIERS.

THERE have been within the last few years some very remarkable enterprises and researches connected with the subject of *glaciers*, or masses of ice among mountain-valleys. M. Agassiz, Professor Forbes, and other philosophers in almost every part of Europe, have been and now are engaged in these researches. Professor Forbes has recently given an account of some of these researches; but we will at present confine ourselves to the description given by M. Desor, for the 'Bibliothèque Universelle de Genève,' and by M. Agassiz, for the 'Edinburgh Philosophical Journal.'

For several successive years M. Agassiz has visited the Alps, for the purpose of remaining among the icy summits of the mountains long enough to make observations on the geological phenomena connected with the formation and progress of the ice. On these occasions he was usually accompanied by a few scientific friends, and aided by experienced guides. As a means of obtaining something like a dwelling-place during their sojourn, they were wont to construct a rude kind of hut under a projecting mass of rock, and there live exposed to rough usage such as nothing but the ardour of science could enable them to bear. The hut became known by the high-sounding title of the *Hôtel des Neuchâtelois*, and has acquired quite a celebrity among scientific travellers. The hut was at a height of seven thousand five hundred feet, built on the icy glacier itself, and far removed from any ordinary habitation.

This icy hotel was simply a cabin twelve feet long, six broad, and four high. It had pure ice for its

foundation, probably a hundred feet in thickness; and on this a layer of broad stones was laid to form a flooring. A bed of herbs, gathered on the sides of the glacier, served as a mattress, on which was placed a double covering of waxed cloth, to keep out dampness. As the sides of the hut were merely formed of a dry stone wall, the inmates endeavoured to guard against violent winds by stopping up the interstices with bunches of grass. It nevertheless happened frequently, in spite of precautions, that a hurricane blew fearfully through the wall; but as the adventurers were generally fatigued by the labours of the day, they slept soundly at night in spite of the storms. It was only on rainy or snowy nights that they were seriously discomposed; for the large block of rock which, by its projection, formed the roof of the hut was fissured throughout, and thus furnished openings for water to penetrate. "Whenever one of these little streamlets," says M. Agassiz, "encountered an inequality, a cascade was formed, which awoke in an annoying manner those who happened to be under it. Sometimes one and sometimes another was seen rising up and seizing a candle, endeavouring with his finger to give another direction to the troublesome rill. But soon recovering its first direction, it would proceed to moisten the person to the right or left, and thus rouse him by dropping provokingly into his ear or mouth. The unfortunate individual would then get up in his turn, and try to correct the course of the water, or probably send it to sprinkle his companion near him."

In order to inure themselves to the cold, several of the party adopted the habit of bathing the body every morning in iced water, in a large tub which the guides placed every evening before the door of the hut. At first this practice seemed severe, but they soon became accustomed to it, and did not then wish to give it up; for, after the first disagreeable sensation was surmounted, they were sure to feel warm, and could wear their ordinary dresses with impunity; whereas those who dreaded the icy bath, and did not make use of it, suffered from cold afterwards much more than the others.

In the expedition of 1841 there were six gentlemen and six guides, the former occupying the Hotel des Neuchâtelois, and the latter another hut at a short distance. The day's labours consisted in making meteorological observations; boring a hole through the whole thickness of ice under foot, as a means of determining the depth of the glacier; visiting the mountain summits to view the surrounding district, or the valleys which separated them. These being the principal objects of employment, the day passed generally thus:—Jacob Leuthold, the chief guide, who was at the same time chief cook, came to the 'hôtel' at four or five in the morning to prepare breakfast, which consisted of chocolate and cold eatables. When their employers had breakfasted, the guides made their own breakfast of a kind of cheese-soup. After this, every one went to work in some way or other, in furtherance of the scientific object in view; and the party did not re-assemble at the hut till about noon. All congregated round a fire, each one bringing with him an appetite which gave a relish to anything that the cook had been able to prepare. Mutton, goat's flesh, and rice were the principal viands; and these were eaten in the open air, a large flat block of stone serving as a table. A cup of coffee and a cigar concluded the dinner, and the party then again dispersed on their rambles. Returning to the hut at about seven o'clock in the evening, they sat down to another hot meal, outside the hut (for the 'hôtel' seems to have served only as a sleeping-room). The supper being over, they entered the hut, and exchanged the day-dress for a warm clothing of cloaks and furs; and when night arrived, they closed the curtain which served as a door, lighted a candle, wrapped themselves up as well as they could, and went to sleep.

They passed about a month in this manner, during which time they had numerous visitors, attracted, during their journeys across the Alps, by the existence of such a novel kind of ice-bound colony. Some of these visitors were men of science, from England, France, Germany, and Switzerland, while others were mere pleasure tourists.

It was only during the summer months that this prolonged residence on the Glaciers was bearable. But, as a means of determining an important question concerning the motion of glaciers in winter, MM. Agassiz and Desor resolved on making the ascent to these cold regions in the beginning of the month of March, when winter still presents its rigorous aspect in the Alps. This occurred in the year 1841; and they went, among other objects, to visit their Hôtel des Neuchâtelois. The state in which they found this rude abode, and the struggles which they had to encounter before they could reach it, will further illustrate the rugged path which they had marked out for themselves.

In the course of the journey, the travellers came to the mountain of the Grimsel, situated between the Alpine valleys of Valais and Hassli. A small traffic is carried on between these districts; the inhabitants of the one bringing cheese, and those of the other bringing wine, brandy, rice, and other provisions from the south. The barter is carried on at the Hospice of the Grimsel, where both parties meet, and again return to their homes. A little of this traffic is carried on in winter; but if the weather be very severe, all intercourse is stopped, and the keeper of the Hospice is then in a very desolate situation. During the winter of 1839-40 he passed thirty-five days without seeing a human figure. "This long isolation," he remarked, "seemed to me so painful, that, on perceiving the first traveller who passed the Grimsel, I threw myself on his neck, embraced him, and offered him a bottle of wine."

When they arrived at the spot where they had left their *Hôtel* the previous summer, they were astonished to see no vestige of it; but after a little search they found it entirely covered with snow. They rebuilt the hut, so as to accommodate a larger number of persons; and made a kind of kitchen in front of the entrance, and a store-room under a neighbouring projecting block of stone; while the guides built themselves a separate hut at a short distance.

Among the exploits which marked the sojourn on the Glaciers was a descent to a great depth in a hole or fissure in the mass of ice. The hole was about eight feet in diameter, descended vertically to an unknown depth, and had water at the bottom. A framework was constructed over the pit, with a windlass and long rope. To one end of the rope was attached a cross board, on which M. Agassiz sat; while a strap, passing round his body, fastened him to the rope. Thus seated, with a marmot's-skin cap on his head, and a goat-skin on his shoulders, Agassiz was gently lowered, time being allowed to him to examine the state of the ice forming the sides of the hole. When he had got down to a depth of about eighty feet, he suddenly found his feet dipping into water: he shouted out; but, through some mistake, those above went on lowering, instead of raising him. Feeling then seriously alarmed, he uttered what was at once understood to be a cry of distress, and he was forthwith hauled up—in some trepidation at various sources of danger which had not at first occurred to him.



[The Triumph of Neptune.]

THE LORD MAYOR'S SHOW.

[Continued from p. 446.]

PAGEANTS of a similar character to those described in our last Number were produced at every mayoralty, being invented and the verses written occasionally by authors of considerable celebrity in their time, but their incongruities have been amusingly satirized by Shirley, in his 'Contention for Honour and Riches,' 1633, by Clod, a countryman, who exclaims, "I am plain Clod; I care not a bean-stalk for the best *what lack you** on you all—no, not the next day after Simon and Jude, when you go a-feasting to Westminster, with your galley-foists and your pot-guns, to the very terror of the paper whales; when you land in shoals, and make the understanders in Cheapside wonder to see ships swim upon men's shoulders; when the fencers flourish and make the King's liege people fall down and worship the devil and St. Dunstan; when your whifflers are hanged in chains, and Hercules' club spits fire about the pageants, though the poor children catch cold, that show like painted cloth, and are only kept alive with sugar-plums; with whom, when the word is given, you march to Guildhall, with every man his spoon in his pocket, where you look upon the giants and feed like Saracens, till you have no stomach to Paul's in the afternoon. I have seen your processions and heard your lions and camels make speeches, instead of grace before and after dinner. I have heard songs, too, or something like 'em; but the porters have had the burden, who were kept sober at the City charge two days before, to keep time and tune with their feet; for, brag what you will of your charge, all your pomp lies upon their back."

From 1639 to 1655 no pageants were exhibited; the unhappy civil wars of England broke out, and the city became one of the strongholds of Puritanism. Isaac Pennington, who was mayor in 1648, rendered himself eminently conspicuous by "the godly thorough reformation" he practised in the city. At his orders Cheapside Cross was demolished, and St. Paul's desecrated, a wit of the day sticking a bill to this effect upon the door:—

> "This house is to be let,
> It is both wide and fair;
> If you would know the price of it,
> Pray ask of Mr. Mayor."*

During the mayoralty of Sir John Dethick, in 1655, the first restoration of pageantry took place; for on the day of his inauguration he exhibited the usual realization of the arms of the Mercers' Company, of which he was a member—the crowned Virgin, who rode in the procession with much state and solemnity. The number of pageants yearly exhibited continued gradually to increase until 1660, the year of the Restoration of Charles II., when the Royal Oak was exhibited as the principal feature of the day's display, and gave title to Tatham's descriptive pamphlet; after which period they gradually increased the splendour and importance of the Shows, which contained many allusions to the blessings of the Restoration and the *virtues* of Charles II., in contradistinction to the days of Oliver. Thus, in the Pageant for 1661, Justice inveighs against—

> "The horrid and abominable crimes
> Of the late dissolute licentious times"—

and in proportion as Charles increased in open libertinism and unmasked tyranny, just in the same degree do the City laureates ascend in the scale of praise, until, in 1682, at a time when the breach between Charles and the citizens was daily widening, the charter of the city was suspended, and the pliant creatures of his own party only allowed office as mayor, the walls of Guildhall echoed to a song in which his majesty was described as a person—

> "In whom all the graces are jointly combined,
> Whom God as a pattern has set to mankind."

* A cant term for shopkeepers, from their cry before their shop-doors.

* After the Restoration, Pennington was tried with twenty-eight others as regicides, was convicted of high treason, and died during his confinement in the Tower of London.

From 1664 to 1671, the great fire* and the plague also, hindered the ordinary exhibition of pageantry, which generally consisted of two or three pageants on the water, one of which was generally Neptune and Amphithrite, the Thames and attendants, or the Story of the Voyage for the Golden Fleece, which pageants were brought to land, and swelled the procession to Guildhall. There is a curious series of wood-cuts, by Jeghers of Antwerp, representing the pageants there exhibited on great state occasions by the various guilds, and which may have given our citizens a few ideas for their own: one of them is precisely similar to the Triumph of Neptune, as exhibited in London, bearing the same name, and agreeing in all points with the description published by the City poets; it is given at the head of our paper, and is curious inasmuch as it exhibits the mode adopted for hiding the machinery and movers of the pageant, and for obviating as much as possible the absurdity of water triumphs swimming through the streets, by covering the lower portion down to the ground with cloths painted to represent water, and fishes swimming therein, having two windows in front for the men withinside to direct its motions amid the crowd.

It would be impossible in the space we have at disposal to give but a mere mention of all the various pageants exhibited until their final discontinuance in 1702. Many displayed considerable invention and mechanical ingenuity, which involved great expenditure; thus the Pageant for 1617 cost more than 800*l*., but they continued to diminish in cost; in 1685, 473*l*. was the outlay. Each company generally contributed its trade pageant on the mayoralty of a member; thus the Goldsmiths exhibited a laboratory with their patron, Saint Dunstan, who gratified the mob by seizing the Devil by the nose with his tongs the moment he answered the Saint's challenge to appear at his peril. The Drapers gave the Shepherds and Shepherdesses with their lambs, carolling in praise of country life, and dancing beneath the greenwood; while the Grocers generally exhibited a King of the Moors, an island of Spices, and mounted Blacks, who liberally distributed foreign fruit from panniers at their side to the crowding spectators. In the Pageant for 1672, two great giants, each fifteen feet high, were "drawn by horses in two several chariots, moving, talking, and taking tobacco as they rode along."

The pageant produced for Sir William Hooker, of the Grocers' Company, in the year 1673, was concocted by Thomas Jordan, the most facetious of City poets, who had formerly been an actor at the Red Bull Theatre. But perhaps as quaint and curious imaginings were exhibited on the mayoralty of Sir Francis Chaplin, of the Cloth-workers' Company, in 1677, as in any of their Shows. They were also invented by Thomas Jordan, who produced on this occasion a "Chariot of Fame," a "Mount of Parnassus," with Apollo and the Muses, attired as shepherds and shepherdesses in honour of the Company, and "the Temple of Fame," within which stood that venerable character, attended by six persons, representing a Minute, an Hour, a Day, a Week, a Month, and a Year; thus habited, viz.:—

"A Minute, a small person in a skie-coloured robe, painted all over with minute-glasses of gold, a fair hair, and on it a coronet, the points tipped with bubbles; bearing a banner of the Virgin.†

"Next to her sitteth an Hour, a person of larger dimensions, in a sand-coloured robe, painted with clocks, watches, and bells; a golden mantle, a brown hair, a coronet of dyals, with a large sun-dyal in front, over her brow; in one hand a golden bell, in the other a banner of the golden ram.*

"A Day, in a robe of aurora-colour; on it a skie-coloured mantle, fringed with gold and silver, a long curled black hair, with a coronet of one half silver the other black (intimating Day and Night); in one hand a shield azure, charged with a golden cock, and in the other a banner of the Cities.

"Next unto her sitteth a virgin, for the personating of a Week, in a robe of seven metals and colours, viz. or, argent, gules, azure, sable, vert, and purpure; a silver mantle, a dark brown hair, on which is a golden coronet of seven points, on the tops of which are seven round plates of silver, bearing these seven characters, written in black, viz.: ☉ ☽ ♂ ☿ ♃ ♀ ♄, which signifie the planets and the dayes; in one hand she beareth a clock, in the other a banner of the companies.

"Next to her sitteth a lady of a larger size, representing a Month (of May), in a green prunello silk robe, embroidered with various flowers, and on it a silver mantle fringed with gold, a bright flaxen hair, a chaplet of May-flowers, a cornucopia in one hand, and a banner of the king's in the other.

"Contiguously (next to her) reposeth a very lovely lady representing a Year, in a close-bodied silk garment down to the waist, and from the waist downward to her knees hang round about her twelve labels or panes, with the distinct inscriptions of every month; wearing a belt or circle cross her, containing the twelve signs of the zodiack: a dark brown hair, and on it a globular cap (not much unlike a turban), with several compassing lines, as on a globe; in one hand she beareth a target, argent, charged with a serpent vert, in a circular figure, with the tip of his tail in his mouth; in the other a banner of my lord mayor's."

The dissension that sprung up between Charles II. and the citizens, towards the close of his reign, acted prejudicially to the annual civic displays. In 1681 Sir John Moore was elected in opposition to the citizens, being greatly favoured by the court party. But pageantry again revived during the reign of William III., though the spirit of the old shows had departed, and the inventive genius of the City laureates had fled with it.

The last City poet was Elkanah Settle: he had been preceded by Peele, Munday, Dekker, Middleton, Webster, and Heywood, the dramatists; John Taylor, the Water-Poet, Tatham, Jordan, and Taubman. The last public exhibition by a regular City poet was in 1702, on occasion of the mayoralty of Sir Samuel Dashwood, of the Vintners' Company, and it was perhaps as costly as any. The patron saint of the Company (St. Martin) appeared, and divided his cloak among the beggars, according to the antient legend; an Indian galleon rowed by Bacchanals, and containing Bacchus himself, was also exhibited; together with the chariot of Ariadne; the Temple of St. Martin, a scene at a tavern entertainment, and an "Arbour of Delight," where Silenus, Bacchus, and Satyrs were carousing. Settle also prepared an entertainment for 1703, which was set aside by the death of Prince George of Denmark, the husband of Queen Anne, who died on the 28th of October, the day before its intended exhibition.

This last attempt at resuscitating the glories of the ancient mayors being so unfortunately frustrated, and the taste for such displays not counterbalancing that for economy, no effort was made to revive the annual pageantry, and the display seems to have sunk to the level at which it has remained for more than a cen-

* This calamity was the excuse for omitting the usual religious observances of the day. Jordan, in his Pageant for 1672, tells us that the mayor was now always conducted home from the hall "without that troublesome night-ceremony which hath been formerly, when St. Paul's church was standing."

† The arms of the Mercers' Company

* The crest of the Company of Clothworkers.

tury; the barges by water, or a single impersonation or two on land, being all that were exhibited.

Hogarth, in his concluding plate of the 'Industry and Idleness' series, has given us a vivid picture of the Lord Mayor's Day in the city, about the middle of the last century, which has been copied at the head of this paper. Frederick, Prince of Wales, and his princess, are depicted seated beneath a canopy at the corner of Paternoster Row, to view the procession. Other spectators are accommodated on raised and inclosed seats beneath, the members of the various companies having raised stands along Cheapside, that of the Mercers appearing in the foreground, while every window and house-top is filled with gazers, the streets being guarded by the redoubtable City militia, so humorously satirized by the painter, and one of whom, anxious to honour the mayor, discharges his gun as he turns his head aside, and shuts his eyes for fear of the consequences. The mayor's coach, with its mob of footmen, the City companies, the men in armour, and the banners, present as perfect a picture as could be wished of this "red-letter day" in the City.

In 1761, when King George III. and his queen, in accordance with the usual custom, dined with the mayor on the first Lord Mayor's Day of their reign, a revival of the ancient pageants was suggested and partly carried out. Among the City companies, the Armourers, the Braziers, the Skinners, and Fishmongers particularly distinguished themselves; the former exhibited an archer in a car and a man in armour; the Skinners were distinguished by seven of their company being dressed in fur, "having their skins painted in the form of Indian princes;" while the Fishmongers exhibited a statue of St. Peter, their patron saint, finely gilt; a dolphin, two mermaids, and two sea-horses.

Sir Gilbert Heathcote, in 1711, was the last lord mayor who rode in his mayoralty procession on horseback, since which time the civic sovereign has always appeared in a coach, attended by his chaplains, and the sword and mace bearers, the former carrying the pearl sword presented to the city by Queen Elizabeth upon opening the Royal Exchange; the latter supporting the great gold mace, given by Charles I. to the corporation. The present coach, which is the most imposing feature of the modern show, was built in 1757, at a cost of 1065*l* 3*s*. Cipriani was the artist who decorated its panels with a series of paintings, typical of the Virtues, &c., which may not unaptly be considered as the last relics of the ancient pageants that gave their living representatives on each Lord Mayor's Day, to dole forth good advice to the chief magistrate of London.

Men in armour are the anticipated "sights" of our modern civic displays. The armour is generally borrowed from the Tower or from the theatres. The number of these "armed knights" varies at different times: in 1822 three of them were exhibited, with their attendant squires bearing their sword and shield, accompanied by banner-bearers and heralds. In 1825 five were exhibited, one in copper armour, one in brass scale armour, a third in brass chain mail, the other two being armed in steel and brass. In 1837 the far more attractive novelty was something like a revival of the ancient pageantry, in two colossal figures, representing Gog and Magog, the giants of Guildhall; each walked along by means of a man withinside, who ever and anon turned their faces; and as the figures were fourteen feet high, their features were on a level with the first-floor windows. They were extremely well contrived, and appeared to call forth more admiration than fell to the share of the other personages of the procession.

The armed knights and their attendants continued to be the staple ornament of the shows until 1841, when Alderman Pirie exhibited that very ancient feature of a Lord Mayor's Show—a ship, fully rigged and manned, which sailed up Cheapside as "in days o' lang syne." It was a model of an East Indiaman of large size, the yards filled with boys from the naval schools, and it was placed in a car drawn by six horses; and the attention it attracted would seem to warrant the introduction of some feature in the dull common-place arrangements of the procession, as usually exhibited; and which, considered as the public inauguration of the chief magistrate of the first city of the world, is certainly capable of much improvement.

LOCOMOTION OF ANIMALS.—No. IV.

It has been seen in Article III. that the erect position is natural to man, and dependent on the figure and structure of his framework, and, when mechanically considered, not the effect of education. The human body is supported during progression on one or both legs, and the conditions of its locomotion differ from those of almost all other animals. We may observe that when locomotion takes place, the centre of gravity of the body must be lowered from the position in which it is found when standing perfectly erect; and for this purpose the legs are furnished with three joints, the first of which connects them to the trunk, the second is the hinge-joint of the knee, and the third is the ankle-joint, the structure of which partakes of the hinge-like action of the knee, but has also a small extent of lateral motion. It is owing to the power of flexion and extension of the legs that it is possible to carry the centre of gravity of the body almost in a perfectly horizontal line and with a uniform velocity. The length of the legs in man, if measured from the hip-joint to the ground when standing erect, is found in most persons to be greater than the length of the rest of the body above that point. Of the three joints of the leg, the first, or hip-joint, allows it only to move forwards,* the second, or knee-joint, allows it only to move backwards; and the third, or ankle-joint, either backwards or forwards. In *Fig.* 1 we observe the greatest length the leg can assume by the complete extension of all its joints, this length being the distance between *a*, the head of the thigh-bone, and *c*, the convex surface of the ankle-joint. In *Fig.* 2 we have the least length of

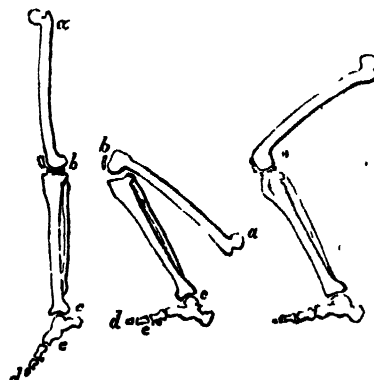


Fig. 1. *Fig.* 2. *Fig.* 3.

the leg, produced by the simultaneous flexion of all the joints, but this bending of the leg is evidently much greater than is necessary in the act of quickest walking, during which the bending of the leg is as represented in *Fig.* 3; so that the range of motion in the several joints of the legs is greater than is neces-

* This is not strictly, though very nearly, true, the range backwards being only 5°.

sary for the common purposes of walking, but is essential to some other attitudes. It will be observed that the length of the thigh-bone is nearly equal to that of the leg from the knee to the ankle, and in consequence of the opposite directions in which the limbs move upon the joints, we are enabled to perform the following curious function:—If the heel be raised from the ground about 41°, so that the body rests on the ball of the foot only, the centre of gravity may be made to descend in a vertical line by bending all the joints of the legs simultaneously (*Fig.* 4): a reference

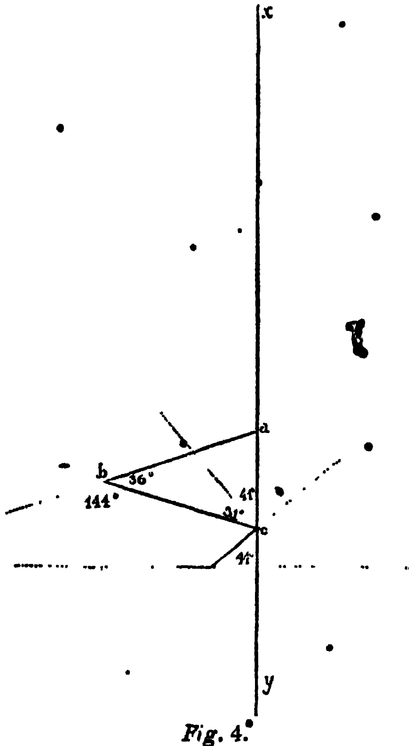


Fig. 4.

to the figure will show how this is accomplished. The entire range of the knee-joint being, in round numbers, 144°, the least angle that can be formed between the leg and thigh is 36°; and since the distance from the hip-joint to the knee when bent is equal to the distance from the knee to the ankle, the hip-joint *a* will always be found in the vertical line *x y*, and when the knee-joint is fully bent, *i. e.* when the leg and thigh are inclined at an angle of 36°, each of the angles at the base of the equilateral triangle *a b c* will be 72°; now the utmost forward range of the leg upon the ankle is only 31°, therefore the heel must be raised 41° in order to throw the leg sufficiently forward to make the angle between itself and *x y*, the vertical line, 72°, by which means the point *a* will have descended to the lowest possible position in that line. This is a property peculiar to the structure of the human frame. In the act of standing both legs concur to the support of the trunk, and for this purpose alone there is a considerable expenditure of force employed to keep the centre of gravity of the body above the ground; and we all know that in standing for a considerable length of time great weariness is experienced; and although the force exerted in standing is less than in walking and running, it is nevertheless estimated to be equal the height of the centre of gravity multiplied by the weight of the body—at least this is the estimate made by Poisson, in his 'Traité de Méchanique,' Paris, 1833, section 688. Hence we see the great increase of labour that corpulent persons undergo, compared with that of persons of slighter dimensions; for not only is the weight greater in the former, but the centre of gravity is placed higher from the ground, so that the product of an increased weight with a greater height is very perceptibly felt whilst standing, and more so whilst walking, as we shall hereafter see. We have stated that the centre of gravity of the body in walking is borne along with a uniform velocity; but this is not strictly true, for at the end of each step the motion of the centre is slightly accelerated, and retarded at the commencement of the step; but as these changes occur in every step precisely in the same way, the result may be considered to be a uniform motion. The term *uniform motion* must be understood to mean that the body moves through equal spaces in equal units of time; and by *velocity* we understand the rate of a body's motion, which is measured by the space through which the body does or would, if left to itself, move uniformly in a given time.

Walking.—In walking, as well as in running, we may divide the body into two portions: first, the portion which constitutes the burden to be borne, consisting of the trunk, head, neck, and arms; and, secondly, that which supports the burden, and propels it along, consisting of the legs. In walking, the trunk, with its appendages, is carried forward on the heads of the thigh-bones, like a rod poised lengthwise on the tip of the finger; and we know that if the finger be moved onwards when the rod is poised vertically, it will fall backwards, and that it must be inclined forwards to preserve its position on the finger, indeed its inclination must be very nicely adjusted to prevent it falling as the finger moves forwards, and this inclination must be greater as the movement of the finger is increased; and if the wind moves in an opposite direction, a still greater inclination of the rod becomes necessary, and those who have made the experiment must be aware of the difficulty, unless after much practice, to keep the rod thus balanced from falling. Now the human body is balanced on each leg alternately, in a manner precisely similar to and subject to the same conditions of equilibrium as the rod; the trunk must therefore be inclined forwards during progression, and its inclination must be greater or less, according to the velocity of the movement and the resistance of the air. It is for this reason that we see persons inclining their bodies very much forward in walking against a strong wind, and almost erect when walking in the same direction as the wind. Bearing, then, these principles in mind, we can easily understand why it is that every movement of the arms, head, neck, and trunk, and every position of the legs, requires a simultaneous movement of all the rest of the body to keep the whole poised on the heads of the thigh-bones during walking.

The measures of the inclinations of the trunk due to different velocities have been taken by Messrs. W. and E. Weber, and are quoted in Dr. Todd's 'Cyclopædia of Anatomy and Physiology,' part 23, article 'Motion,' page 460, where the conditions necessary to keep the trunk poised on the legs will be found investigated more at large. The arms, being attached to the upper part of the trunk, and considerably above the axis of motion, or line through the hip-joints, and being moreover free to move in almost every direction, except in that which would tear them from the body, contribute a great deal towards keeping the trunk in a state of equilibrium on the legs, and thus dispense with that large amount of muscular force which would otherwise be required for that purpose: hence in walking we observe the arms in constant motion, oscillating backwards and forwards at every step, and we find, on more closely inspecting the order in which they move, with

respect to the legs, that whilst the right leg swings forward, the trunk is turned round horizontally on the head of the left thigh-bone, which tends to advance the right shoulder before the left, but this is counteracted by the right arm, which swings backwards, and by the left, which at the same time swings forwards, and the combined effect of these two motions is to neutralize the twisting of the upper part of the trunk on the legs during each step. A corresponding effect takes place when the left leg swings forwards, so that a good walker can move without any sensible twisting of the body, which is, however, generally apparent in the female sex, arising from the greater distance between the heads of the two thigh-bones in them than in males. The swinging of the arms then is attended with considerable advantage, for not only do they lessen the amount of muscular exertion, but give a greater freedom to the attitudes assumed by the trunk in walking and a more easy style of movement, and a graceful gait results from their well-regulated oscillation. When the arms, however, are made to describe very large curves externally to the vertical plane in which they swing naturally, a trick which youths are prone to under the erroneous idea of thereby adding to the manliness of their appearance, the effect is in reality extreme awkwardness, for the shoulders are thrown alternately forwards, and much muscular strength is wasted, as may be verified by any one who tries to walk in this manner for a long time and at a rapid pace.

In walking, the centre of gravity does not move in a perfectly horizontal line, but it is raised and depressed during each step. Weber found, by an apparatus designed for that purpose, that in ordinary walking, when the length of the step taken was 2.39 feet, the mean elevation and depression was 1.1 inch, and this quantity of vertical motion was very nearly the same whether the speed was increased or diminished. In walking on the ball of the foot the mean elevation and depression of the trunk did not exceed 0.8 inch.

We have already mentioned what quantity of force is necessary to be expended to support the body in standing, but in walking, each leg has not only to sustain in its turn the whole of the superincumbent parts, with the additional weight of the swinging leg, but to push the body forwards, and for these purposes the force is very considerable. The resistance to the forward movement of the body arises from the friction of the joints, the friction of the sole of the foot upon the ground, and of the air, but the principal resistance is that of the advanced leg when it reaches the ground.

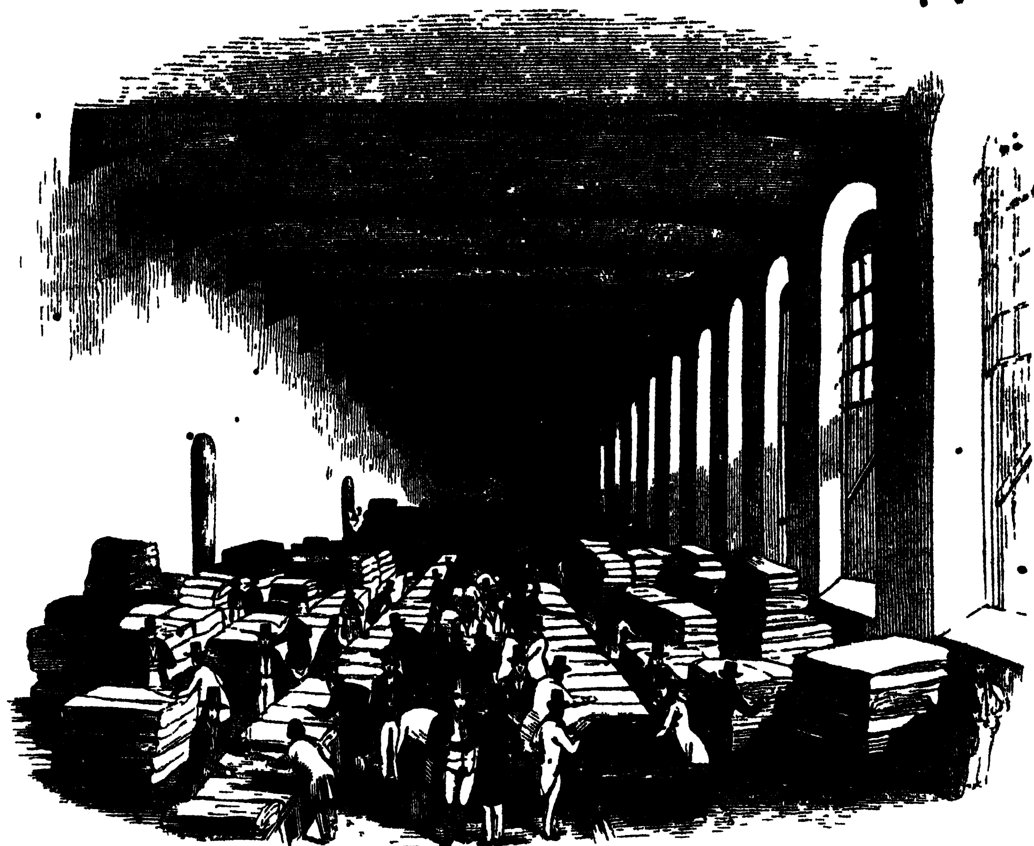
It has been always supposed, until a very recent period, by those whose business it is to study the structure and operation of the several organs of animal bodies, that the swinging of the legs in walking and running depended on the action of the muscles. It has, however, been discovered by MM. W. and E. Weber that the leg swings after it has been raised from the ground by the force of gravity alone, and that it obeys the same laws as the pendulum of a clock. In fact they regard the supporting leg as the substitute for the weight of a clock, and the swinging leg as the substitute for the pendulum, each leg exchanging its office successively. We have here, then, an illustration of the connection between the laws which govern the solar system and those which govern the locomotive actions of the organs of human beings.

Now as the leg swings according to the laws of the pendulum, and moves forwards without the active interposition of its muscles, we must see how much the economy of the power which is destined to enable us to move upon the earth has been provided for in the formation of the human race, for were the muscles of the legs employed in this movement, their force would soon be exhausted, and we should be able to move over a very limited space in a long time.

It is well known that a short pendulum will vibrate much quicker than a long one, and that the time of one vibration of the pendulum of all clocks is regulated upon this principle, but to be more precise, the times of the periodic oscillations of any two pendulums are respectively as *the square roots of their length*. By applying these principles to the swinging leg of a man in walking, we can easily understand why persons with short legs take more rapid steps than persons with long legs, and why males and females rarely step together, unless the former accommodate the length of their step to the time of the latter.

Overland Route to India.—Aden presents us with one of those phenomena which the giant 'steam' is every day and everywhere achieving. Barren rocks and a few yards of sandy shore once tenanted only by the sea-gull and the crab are now covered by cheerful domiciles, and animated by a small but busy and contented population, who live by unloading the fuel ships, storing and protecting the coal, and embarking it upon the steamers. Upon the shore of a little bay, formed by a small belt of rocks, stands a spacious and commodious building of wood, wattle, and dab covered within and without by whitewash, and duly matted and thatched, which serves the purpose of an hotel. Some enterprising Parsees from Bombay start[ed] and maintained this establishment, where the steamboat traveller will find an excellent and (all things considered) not expensive table and cellar, clean beds, white linen and excellent attendance. Fire wood and sweet water being brought from a considerable distance, must necessarily be dear, but they do not constitute special items in the bill, unless you indulge in a fresh bath, when four shillings, or two rupees, are payable. Donkeys and their attendant vagabond owners are available by scores, and it is usual to hire one for a ride to the Arab town of Aden, four miles from the anchorage, and inspect the scene of many a bloody strife before our troops established their present footing on the soil of the Ishmaelite. A six days trip from Aden, with the delightful concomitants fine weather and pleasant breezes, carried us to Suez. . . . Thanks to the exertions of the British agents and associations, who make it their business to promote the intercourse with India, there is little difference now between travelling seventy miles over a post road in England and going over the same space of ground on the Isthmus of Suez. Forty vans each drawn by four good horses, and driven by an Egyptian Jehu, carrying from four to six inside and none out, transport the living contents of two crowded steamers across the arid and desolate plain which divides Cairo from the Red Sea. Some of the vans have arched roofs, like those of common waggons, waterproof, and painted green. They are all light, but very strong, and capable of bearing without damage, the violent collisions with lumps of stone and rock to which they are exposed in some parts of the road. The passengers sit omnibus fashion, at the sides of the vehicles, entering at the back, an arrangement that is unavoidable from the height of the wheels (a single pair), which reach half way up the body of the van. The seats are carpeted, and the whole thing is roomy and commodious. At the end of every ten or twelve miles, horses are changed at a sort of road-side stable inn, erected for the purpose, at two or three of which the traveller will get a capital dinner, or breakfast, or luncheon, of eggs, mutton-chops, roast pigeons, stewed fowls, potatoes, bread, and good bottled ale, with tea or coffee, if he prefer them. Midway, and again at the halting place twenty miles from Cairo, there are divans or sofas all round the chief apartment, and bed-rooms for ladies and married people. At one of these it is as well to sleep for a few hours, for sixteen hours' continued travelling in the vans will be found *de trop* by people unaccustomed to great fatigue. After the desert—the scenery of which may be described as a dreary flat, only diversified by sand-hills, stones, rat-holes, camel skeletons, and two trees—the view of Cairo, the 'City of the Tombs,' is extremely pleasing. The Nile meandering through fields of corn or rich pasture-land, the white sails of the boats gliding on the river's bosom, the foliage of the gardens in the suburbs of the town, the mosques and minarets, the palaces, and the distant, though apparently proximate, pyramids,—form a picture grateful to the eye and agreeable from historical association.—*Asiatic Journal for October.*

A DAY AT A LEEDS WOOLLEN-FACTORY.



[Coloured Cloth Hall, Leeds.]

When Leland, three centuries ago, called Leeds a "praty mercat towne, having one paroche church, reasonably well builded," it is evident that he did not regard it as a busy centre of manufacturing operations, receiving the produce of the neighbourhood, and distributing it to all quarters of the world. Nor indeed are there any indications that the present "clothing metropolis" was at that time eminent in respect of the woollen manufactures of the West Riding; for it is mentioned as being subordinate to Halifax, to Wakefield, and to Bradford. And even all these towns taken collectively did not represent the chief seat of this branch of productive industry; since the West of England was at that time, and continued to be till a comparatively recent period, the most important clothing district in England.

The changes which the woollen manufacture, as respects both localization and mode of management, has been and is now undergoing, are very remarkable. Some years ago the 'West of England cloths' were the test of excellence in this manufacture; while the productions of Yorkshire were deemed of a coarser and cheaper character. At present, although the western counties have not deteriorated in their product, the West Riding of Yorkshire has made giant strides, by which equal skill in every department has been attained; while the commercial advantages resulting from coal-mines, from water-power, from canals and railroads, and from vicinage to the eastern port of Hull and the western port of Liverpool, give to the West Riding a power which Gloucestershire and Somersetshire cannot equal. The steam-engine, too, and various machines for facilitating some of the manufacturing processes, have been more readily introduced into the former than into the latter, a circumstance which, even without reference to other points of comparison, is sufficient to account for much of the recent advance in the north.

When we look at a map of any district where the woollen manufacture has been long carried on, we find that it usually exhibits a range of hills and valleys, with streams flowing from and between the former into the latter; and a glance at the processes of manufacture shows why this is the case. The water required in both the preparatory and the finishing processes, and the power required to work the fulling-stocks, rendered the vicinage of a river very important, especially when steam-engines and Artesian wells were hardly known. Dyer, in his poem of 'The Fleece'—a production more remarkable for the singularity of its object than for the excellence of its poetry, it being a kind of history of wool and the woollen trade "done into verse"—notices in the following lines some of the uses to which a clear stream was applied by the clothiers of eighty years ago:—

> "Next, from the slacken'd beam the woof unroll'd,
> Near some clear-sliding river, Aire or Stroud,
> Is by the noisy fulling-mill receiv'd;
> Where tumbling waters turn enormous wheels,
> And hammers, rising and descending, learn

To imitate the industry of man.
Oft the wet web is steeped, and often rais'd,
Fast-dripping, to the river's grassy bank;
And sinewy arms of men, with full-strain'd strength,
Wring out the latent water."

Whether we go into Gloucestershire, Wiltshire, or Yorkshire, we shall find these streams watering the clothing districts. In Gloucestershire there is a district called the "Bottoms," containing the parishes and towns of Dursley, Cam, Uley, Alderley, Wickwar, Stroud, Wootton-under-Edge, Avening, Painswick, Pitchcomb, Randwick, Minchenhampton, Biesly, Rodborough, Stonehouse, King's Stanley, Leward Stanley, Wood Chester, Horsley, and Eastington,—in which, and in all the villages around, woollen cloths are manufactured in large number; Stroud being a kind of centre to the whole; and here we find the Stroud-Water and other small streams flowing past these several places towards the Severn. In Wiltshire the chief clothing towns, Bradford, Chippenham, Melksham, Trowbridge, and Westbury, are all situated either on the Avon itself or on one of the streams flowing into it. In Yorkshire, in like manner, the busy clothing towns of Leeds, Bradford, Halifax, Huddersfield, Wakefield, Dewsbury, Keighley, &c. are situated on the banks of streams which are perhaps more abundantly used as manufacturing aids than any others in England, except the Mersey and the Irwell.

We hope to be able, by describing what comes under notice in a visit to one of the large cloth-factories of modern times, to give a general idea of this very interesting branch of manufacture. But there are two matters which must first be glanced at before the true position of such establishments can be understood; viz. the difference between *woollen* and *worsted* goods, and the difference between the *factory* and the *domestic* systems of working. As respects the first point, the sheep's wool employed is separated into two kinds, one of which is long in fibre and the other short; the former being spun and woven much in the same way as cotton or silk goods, while the latter, besides being spun and woven, is *felted, fulled,* or *milled,* so as to produce that peculiarity of surface which distinguishes all woollen cloth. These two branches of manufacture are wholly distinct; different kinds of wool being employed, different machines applied, different factory arrangements made, and different market-halls established. The shalloons, camlets, tabinets, merinos, moreens, duroys, lastings, calimancoes, and a host of other varieties of worsted goods—forming the staple products of Bradford and other towns in the West Riding—will not come under our notice in the present article, the object here being confined to *woollen* manufactures properly so called.

As respects the second point, the difference between the modes of conducting the woollen manufacture is very remarkable. There are three systems followed; the first in the West of England, the second in a large number of villages west and south of Leeds, and the third principally in the towns of Leeds, Halifax, and Huddersfield. In the *master-clothier* system of the West of England the manufacturer buys his wool from the importer or the wool-stapler, and employs persons to work it up into cloth, giving each separate process to distinct sets of men, who work either at their own houses or at the house of the master-clothier. As each man only performs one process, he acquires great manual dexterity at it; and the excellence of the West of England cloth used to be in great part attributed to this subdivision of employment. So high, indeed, was the reputation of the cloths sold at the Stroud and Wiltshire markets, that, before the rapid rise of the Yorkshire manufacture, the Yorkshire clothiers used frequently to travel to the West of England to purchase wool, return to the north to work it up into cloth, and re-convey it for sale to the West of England, as being the most flourishing mart for this commodity.

The *domestic* system of the Yorkshire villages differs considerably from the above. Here the actual workman is a small manufacturer on his own account, and this was the general system pursued before the application of large capitals to the business. These small manufacturers frequently occupy small farms, partly as a means of support, and partly for the convenience of the manufacture. The domestic clothiers have in their houses from one to four looms, on which, and in the process connected with the spinning of the woollen yarn, they employ themselves, their wives and children, and sometimes a few workpeople from their neighbourhood. During harvest the females and children go out to work in the fields. In the primitive form of this system the domestic clothiers carried on the whole process of the manufacture, up to the state of undressed cloth; but as the advantages of machinery and of combined capital became apparent, they gradually adopted a curious mean between the factory and the domestic systems. They erected joint-stock mills by contributions from among themselves, or else independent parties established such mills; and with the aid of these mills, the domestic system now assumes the following form:—the domestic clothier, after purchasing his wool and deciding on the mode in which it shall be worked up, sends it to a mill to be prepared for spinning: it is then brought home for his wife and children to spin, and for him to weave into cloth: it then goes again to the mill to be 'fulled;' and, after being again returned to the clothier, is by him carried a stage or two further, and then sold in the state of 'undressed cloth,' sometimes dyed, and in other cases white. We shall further illustrate some of the features of the domestic system in a future page.

The *factory* system of cloth manufacturing bears a close analogy to that of cotton; it being the growth of steam-power, mechanical invention, and accumulated capital. In the large woollen factories, every step of the process is carried on in one building or one range of buildings, from the sorting of the wool to the pressing of the finished woollen cloth. In this system, as in that of the master-clothiers, the workmen have no property in the material which they are fabricating, their remuneration being simply in the form of wages for labour bestowed; whereas in the domestic system, the manufacturer unites the characters of master and workman in himself.

Let us now witness the arrangements and follow the routine of processes in a large woollen-factory, as a means of obtaining a knowledge of the manufacture.

Among the large cloth-factories at Leeds, that of Messrs. B. Gott and Sons, which, by the kind permission of the proprietors, we have been allowed to visit, is well calculated to facilitate our present object, from the completeness and large extent on which all the processes of the manufacture are there conducted. Leeds, on whichever side we approach it, presents marked evidence, by the numerous tall chimneys visible on every side, of the extensive manufacturing operations carried on. It was estimated in 1838 that there were at that time 106 woollen-mills in the parish of Leeds, employing 9738 hands, 2721 of whom were females; and that there were altogether more than three hundred steam-engines at work in the parish, about half of which were employed in the textile manufactures.* Leeds must necessarily, therefore,

* The existence and extent of the textile manufactures in the eastern part of the town are curiously illustrated by the names of a cluster of five small streets there situated—Mill Street, Worsted Street, Spinner Street, Cotton Street, and Silk Street.

present much of the smoke and bustle of our busiest towns. The greater part of these factories are congregated near or on the banks of the river Aire, which flows through the town from west to east, and presents every indication of commercial activity. When standing on the principal bridge of Leeds, leading from Hunslet to the main High Street, called Briggate, a glance around reveals much of the activity here noticed, though the crookedness of the river prevents the array of factories and warehouses on its banks from being visible so plainly as they otherwise would be.

Proceeding westward from Briggate, past one of the cloth-halls (of which more hereafter), we arrive at a western suburb of Leeds called Bean Ing, where is situated the larger of the two factories of Messrs. Gott. It is an immense pile of buildings, comprising one quadrangle behind another, and both surrounded on every side by long ranges of workshops, warehouses, &c. But before reaching the factory itself, we pass by a pair of folding-gates, giving entrance to a large plot of ground presenting a twofold interest, both from the purpose to which it is now applied, and from the improvements which it indicates in the mode of manufacture. This ground was formerly occupied as a *tenter-field*, where the woollen cloth, in various stages of its manufacture, was suspended by hooks on rails to dry. But the custom became introduced, by degrees, of drying the cloth in close rooms or galleries heated by steam or by hot air; and this has been found in various ways so much more efficacious, that the old system of tentering is no longer acted on in large establishments. The tenter-ground thus set at liberty has been laid out in a series of gardens for the workmen in the factory, and thus presents a most pleasant and healthful boundary to the factory on the eastern side. The extent of ground thus laid out is about eight acres, divided into a hundred and forty-two allotments of nearly equal size. Such of the workmen as take an interest in gardening are allowed to cultivate these little allotments, paying a trifling sum in the form of rent, not as a source of profit to the proprietors, but to give the men an undisputed right to the produce which they may have cultivated. Nearly all the allotments are in a flourishing and healthy condition, each one staked off, separated from the others, and numbered, and each one serving to denote the kind of produce which its cultivator chooses to select. Some contain flowers chiefly; while others (and these more generally) contain such culinary vegetables as potatoes, cabbages, lettuces, onions, &c. The family of one of the workmen reside in a kind of lodge near the entrance, and to this family the care of the garden is entrusted. Opposite the lodge is a tool-house, where, on hooks and rails properly numbered, hang all the gardening tools, such as spades, hoes, rakes, and so forth, each renter having his own tools. In this tool-house is a board inscribed with the 'Rules and Regulations' which the proprietors have established for the good management of the garden: such as the hours during which the workmen and their families may have access to the garden, the admission of the friends of the workmen, and other arrangements of a similar character. In a busy town such as Leeds, where houses and factories are necessarily congregated very thickly, the existence of a plot of garden ground in such a situation is important in respect to the health of those who live near, independent of the good effects likely to result from the maintenance of these kindly relations between masters and workmen.

Withinside the first quadrangle of the factory is a porter's lodge, in which there is an arrangement which serves to illustrate the regularity and system observable in such large establishments. Fixed up against the wall is a shallow recess, closed by doors; and when these doors are unlocked, the recess exhibits to view about a hundred and forty keys, hanging on as many hooks; the whole classified in twenty-six departments, and all the keys in each department numbered. All these keys belong to the various ranges and rooms of the factory; and a well-arranged system of rules is adopted as to the use and custody of them. Another little arrangement of a protective character, such as is often to be met with in large establishments, is a kind of tell-tale clock, so constructed as to show whether the watchman or guard has been at his post during certain stated intervals in the night.

When we arrive within the first quadrangle, we find an open area surrounded by brick buildings. On the north is a long range of wool warehouses, five stories in height, and extending the whole breadth of the premises from east to west. The principal work-ranges are surrounding the inner or southern quadrangle; where one long pile is occupied by a number of men engaged in various handicraft employments connected with the manufacture, another by the machines in which the wool is prepared for spinning, another by the spinning machinery, and others for the weaving, the fulling, the drying, the dyeing, and the numerous processes connected with the finishing the of cloth. There are also various subsidiary buildings, such as an engine-house with two eighty horse-power engines, a room in which the logwood used for dyeing is cut up by two powerful machines into small fragments, an engineering shop for the repair of the machinery, store-rooms for the oils and dyes employed in the works, and so forth. There is a circumstance connected with the steam-boilers and furnaces which is worthy of notice as illustrating a subject in which the town of Leeds has taken an honourable precedence before most other towns, viz. the attempts to consume the smoke, or rather to prevent its formation. Much has been done at Leeds within the last few years to lessen the nuisance of smoke; and the arrangements at the factory under notice exemplify one of the modes of procedure. In the furnace-room each furnace has a thick piece of glass in front, through which the upper part of the fire-chamber can be seen. On a lower level is a kind of pump, with a handle regulated by a weight; and this pump is made to open a valve which admits air into the fire in exact proportion to the fuel used, determined by the experience of the furnace-man. Smoke is simply unburned coal, and is produced through a want of due proportion in the quantity of air admitted to the burning fuel, and to the mode of admission; and the mode of adjusting this supply is so far successful in the present instance, that there is but little smoke rising from the chimney connected with the furnaces to which this apparatus is adjusted.

The general arrangements of the factory, and the nature of the processes carried on therein, may perhaps be best illustrated by selecting a piece of fine blue or black cloth as an example, and following it through its various stages of progress; it being at the same time understood that all the varieties of woollen cloth result from various modifications of some or all of these processes.

First, of the crude wool. The wool of English sheep is not now much used for broad-cloth; it being more adapted for the production of stuffs, camlets, and the different articles coming under the denomination of 'worsteds.' In proportion as the sheep is improved in flesh, so does its wool acquire a quality unsuited for the purposes of the woollen-manufacturer; and as soon as the import duty on foreign wool was so far lowered as to lead to extensive dealings, our woollen manufacturers began to use a larger and larger proportion of foreign wool, until at length it forms by far the greater portion of that employed. Formerly the

Spanish wool was regarded as the finest, and all our best cloth was made from it; but the Spanish sheep being introduced into Saxony and other parts of Germany, the German wool has gradually driven most of the Spanish wool out of the English market. More recently, however, Australia has established a new source of supply, and the wool thence obtained, in respect both of quality and price, is so advantageous to the clothier, that every year witnesses an enormous increase in the quantity imported. We may perhaps state in a general way, that at present our worsted fabrics are made mostly from English wool, our finest woollens mostly from German wool, and the large bulk of our woollens mostly from Australian wool.

The wool is brought to the factory in packages of various shapes and sizes, some almost a cube of three or four feet, some in bags not much less than twelve feet long, and others intermediate between the two forms. Each fleece (comprising the wool from one sheep) of foreign wool weighs from two to two and a half pounds; the coarser English fleece, adapted for hosiery or the worsted trade, weighing sometimes six or eight pounds. Generally the foreign wools are tied up in small bundles of three or four fleeces each, and these bundles made up into packs. When one of the packs of wool is opened, the locks are found to be all entangled together in a confused mass; and they have to be separated and somewhat loosened before any further process can be commenced. But the workman into whose hands the wool first passes has something more to do than merely separate the locks; he has to sort the wool into parcels of different qualities, a process involving very great nicety. Not only do fleeces differ one from another, but different parts of the same fleece present qualities of wool widely diverse; and as these different qualities are appropriate to the production of different kinds of cloth, the preparatory sorting is an important affair. The fingers of the sorter acquire by practice an extraordinary degree of sensitiveness, by which different qualities of fibre, quite unappreciable by others, are at once detected by him. He stands in front of a bench or frame covered with a wire grating, on which he places the wool, and, working nimbly with his two hands, he separates the wool into six, eight, ten, or sometimes as many as fifteen different kinds. It is not mere fineness of fibre which the sorter regards: he takes cognizance of softness, strength, colour, cleanness, and regularity, and regulates his subdivision by all of these qualities. It is said that if the wool-sorter be out of practice for any considerable time, his fingers lose the delicacy of touch indispensable to his occupation. The dust and loose fibres which are shaken from the wool during the sorting fall through the grating into a receptacle beneath, and are thence removed to be sold as manure.

The wool, thus separated into parcels, is scoured or washed in a hot alkaline liquor, as a means of removing some of the grease which it retains from the sheep. In the lower part of one of the buildings are all the necessary appendages of coppers, boilers, vats, and other vessels for both scouring the wool and the cloth and for dyeing. With respect to the dyeing, a difference is observable between cotton goods on the one hand, and woollen or worsted goods on the other. Cotton goods are never dyed in the state of cotton wool; the cotton being dyed, if dyed at all, either after spinning or after weaving. But woollen or worsted goods are never made from wool dyed in the state of yarn, that is, after spinning, but before weaving; the wool being always dyed either in the state of wool, before spinning, or after being woven. This gives rise to the distinction between 'wool-dyed' cloth and 'piece-dyed' cloth, each kind possessing its own peculiar advantages, and each giving employment to a particular market or cloth-hall at Leeds. If the cloth is dyed in the wool, the dyed wool, before undergoing any other process, is laid on a table, and women pick out by hand any small fragments of dye-wood or other impurity which may be mixed up with it.

The first process, by which the locks of wool are dissected, and the fibres loosened one from another, is that which is effected by a machine called a *willy*, or, more equivocally, by the name of a '*devil*.' This willy or devil differs much in shape in different factories; but it is always a kind of hollow receptacle, in the inside of which are a number of sharp teeth, which catch into the locks of wool while revolving within the machine, and tear them open fibre from fibre. In the part of the factory where this process is carried on, a large heap of wool may be seen lying on the floor, where a man or boy sprinkles it with oil as a means of rendering it softer and more easy to work. Some kinds of wool require willying more than once; while other kinds are sufficiently fine to be separated by one such process.

We next follow the oiled wool into a large range of buildings containing the machines which prepare the wool for spinning. Here the clatter of wheels, shafts, and other mechanical appliances, reminds us that we have entered upon that class of operations by which the factory system is most strikingly distinguished from the handicraft system of manufacture. Here machines do the work, and children have the requisite skill for tending the machines; the fingers, certainly, soiled by the oily state of the wool, but the countenances indicating nothing like unhealthiness in the nature of the occupation. The processes which these machines perform are of three kinds, two of them somewhat analogous in character, but the third totally different from either. Of these three, viz. the *scribbling-machine*, the *carding-machine*, and the *slubbing-machine*, the first acts in the following way:—There are several cylinders, on the surfaces of which innumerable wires or points are fixed, bent in determinate directions. These cylinders are so adjusted with regard one to another, that the teeth of one cylinder, while rotating, come nearly in contact with those of the cylinder nearest to it. This being the arrangement, a girl takes the oiled wool by handfuls from a basket, lays it on an endless apron at one end of the machine, and spreads it as equally as she can over a given surface. By the motion of this apron the wool is carried towards the first cylinder, where it is caught by the teeth, and carried round till brought within the action of the second cylinder, which tears it from the first; and so on from one cylinder to another, the teeth of each cylinder removing it from those of the next preceding one. The consequence of this transfer is, that every fibre becomes separated from the adjoining one, and the wool falls from the last cylinder in the state of a light, flocculent, downy layer.

Without leaving the room or shop, this downy layer of wool is next transferred to the *carding-machine*, where it is made to assume a different form. A girl, called the 'carder-filler,' weighs the wool, and puts a certain weight of it on a given area of the endless or feeding apron. The proportion between weight and area depends on the quality of the cloth to be made or the thickness of the yarn to be spun; and much nicety is required in laying the wool equally on all parts of the surface, the fingers of the girl acquiring by practice a delicacy of touch somewhat analogous to that noticed in respect to the wool-sorter. The layer of downy wool, after being laid on the feeding-cloth, is drawn towards a range of cylinders, as in the case of the scribbling-machine, and these cylinders are in like

manner provided with teeth or wires. The wool is first carded or combed out till the fibres lie pretty nearly parallel: and a delicate band or sheet of this carded wool, about thirty inches long by six inches wide, is detached from the rest, and rolled up into the form of a pipe or rod, from a quarter to half an inch in diameter, and as long as the detached sheet of wool. The mechanical arrangements by which this rolling-up of the wool is effected are exceedingly ingenious, and the pipe of wool itself is not less worthy of notice; for we find, on close inspection, that the fibres do not lie longitudinally, but spread out pretty nearly at right angles to the length of the piece. This is a result of the peculiar way in which the roll or pipe is made, and is produced as a means of making the fibres interlace among each other more readily in the process of *fulling*, no such condition being given to the fibres in the production of yarn for *worsted* work, where fulling is not required.

Next we come to the *slubbing-machine*, or *slubbing-billy*, as it is more frequently called in the odd language of the workmen. At this machine the pipes or 'cardings' of wool are joined end to end, and reduced in thickness to an average of perhaps one tenth or twelfth part of an inch. Some years ago public attention was directed to the circumstance that great cruelty was alleged to have been suffered by the children attending these machines in the woollen districts, they being occasionally beaten by the men with the 'billy-roller,' a part of the slubbing-machine. When the matter was investigated, it was found that the children were hired and paid by the men who worked these machines, and that these latter proved often to be hard task-masters. Since then, this source of abuse has been remedied, and all factory arrangements have been placed on a better footing, partly by the masters themselves, and partly by the operation of the Factory Acts. But to return to the slubbing-machine: a sloping apron or feeding-cloth forms one end of the machine, which is generally placed near the carding-machines; and on this cloth the children place the rolls or 'cardings' of wool, placing them parallel, with one end of each hanging down. The remaining parts of the machine consist of machinery for catching each of these cardings at one end, drawing out a small portion, elongating that small portion to many times its original length, imparting a slight twist to the portion thus elongated, winding the 'slubbing' or soft twist on a spindle, and then treating in a similar way another similar portion of each carding. A whole row of cardings are thus worked at the same time; and as each carding is gradually drawn up into the machine, the children attach new cardings to the ends of the former ones, causing them to cohere slightly by a very light rolling and pressing. In this way the children take care to piece (from which occupation they derive their name of 'pieceners') all the cardings in turn; so that each bobbin or spindle becomes filled with a continuous line of 'slubbing,' one ounce of wool yielding from one to two hundred yards of slubbing.

The wool has now reached that state when it is ready to be spun into yarn for the weaver. This is done by those large and beautiful contrivances known as '*mule-spinning machines*,' by which the slubbing is first drawn out to a state of great tenuity, and then spun into yarn. So far as regards the principle involved in this process, it may be regarded as a repetition of the process of slubbing; for in both cases the wool is attenuated beyond its former state, and then spun or twisted. The 'spinning-mules' are about thirty feet long, and each has between two and three hundred spindles, so as to spin an equal number of threads at once.

We have thus traced the wool to the state of spun yarn, and have next to follow its course to the weaver's hands. Some of the yarn is for *warp*, or long threads; the rest for *weft*, or cross threads; and each kind is spun in a particular way, best calculated for the service which it is to render. Some of the yarn is stiffened by immersion in a vessel of warm size made of parchment or leather cuttings. Next succeed the various processes of 'winding,' 'warping,' 'beaming,' 'drawing in,' &c.; by which the yarn is arranged in the proper position for being used by the weaver, the warp attached to the loom, and the weft attached to the shuttle. Most of these preparatory operations have gradually undergone some improvements or other; the warper, for instance, no longer

> "strains the warp
> Along the garden walk, or highway side,
> Smoothing each thread:"

but uses either a warping-frame or a warping-mill to facilitate his proceedings. The preparations being completed, the process of weaving is conducted much in the same way as any other kind of fabric, the looms presenting no peculiarity of construction, except in respect to the large size of those required for weaving the broadest cloth. It may seem remarkable, that while steam-power weaving is making such rapid strides in the cotton manufacture, it has hitherto been but little introduced in the weaving of woollen cloth; yet such is the case. Cloth-weaving has always been deemed among the higher branches of that art; insomuch that, other things being equal, a hand-loom cloth-weaver earns more than twice as much wages as a hand-loom cotton-weaver. This results from the former being essentially *man's* work, requiring muscular power as well as manual dexterity; whereas cotton weaving can often be done by women and children, thereby lowering the standard of wages. At the present day some of the woollen factories exhibit weaving by steam-power, some by hand-power, and some by both; while all the manufacturers on the domestic system of course adopt the system of hand-weaving.

In regulating the width of the cloth, attention is paid to the remarkable shrinkage which takes place in the after processes. For instance, a piece of cloth to be sixty inches wide when finished, must be woven nearly a hundred inches wide; and the length must be adjusted in the same way. A piece of broad-cloth contains from two to four thousand threads in width, according as it may be '8-quarter,' '10-quarter,' or any other specified width and fineness.

When woven, the cloth passes through a series of processes which illustrate the difference between this branch of manufacture and those relating to cotton, silk, or linen, more remarkably than anything else. It is scoured or cleansed from the remaining oil which may yet adhere to it, and from the size which had been applied to the yarn before weaving. It is then '*milled*,' '*fulled*,' or '*felted*,' that is, beaten until the fibres of wool become so locked into each other as almost to hide the intersecting warp and weft threads. The 'fulling-stocks,' in which this process is carried on, are hollow receptacles in which an enormous oaken hammer or stock vibrates up and down, each stock being kept in motion by machinery connected with a steam-engine. There are twenty-one of these machines in a row, all giving their ponderous blows from morning till night. The cloth is partially opened in the fulling-room; and after a quantity of liquid soap has been sprinkled on it, it is folded up into a pile and placed in the fulling-stocks. It is then beaten for a period, which may to many persons seem extraordinarily long, viz. from two to three entire days, during which it is removed five or six times to have a re-supply of soap. It is only by this long-continued action that the fibres of wool are made thoroughly to interlock; and by so doing the cloth becomes greatly thickened, shortened, and nar-

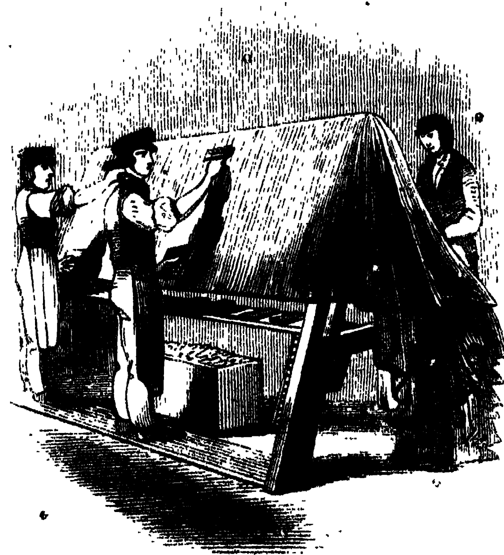


[Fulling Stocks.]

rowed. In order that no hairs, dirt, or irregular threads may be fulled into the substance of the cloth, it is handed up to women called 'burlers' before undergoing this process of fulling. The burlers stretch out the cloth over a sloping table, and with a kind of tweezers pick out all irregular knots, burs, or hairs.

After the scouring, the fulling, and several subsequent processes, the cloth is stretched out and hung up to dry. This used to be done in the tenter-fields, where the tenter-hooks were driven into poles and rails, and the cloth hung on them by the 'list' at the edges. But in the factories there are heated rooms in which the cloth is hung up, where it speedily dries.

The cloth becomes felted into a close fabric by the process of fulling; but it is too rough and uneven at the surface to be used in that state. If the cloth is 'piece-dyed,' it undergoes that process about this stage of the operations; but whether so or not, the cloth goes through many finishing processes before being ready for use. The chief of these are *raising* and *cutting*. In the process of raising, the nap of the cloth is worked up by a brush made either of wires or of teazle-heads, and worked either by hand or by machine. In hand-raising, the workman stretches the cloth over a sloping stand, and rubs it hard with a kind of wire-brush, held like a curry-comb. In machine-raising, the wires, or more frequently teazle-heads, are fixed to the surfaces of cylinders in machines called 'gig-mills,' and the cloth, by passing over these revolving cylinders, has the nap raised up into a very rough surface. There are many modes of effecting this 'raising,' but in all the principle is nearly the same. The use of teazle-heads is a remarkable feature in the process; for no combination of wires has yet been found that will effect the required object so efficiently as the little elastic prickles on the surface of these teazles. What these teazles are, and whence they are procured, may be seen by referring to our No. 20. They are brought to the factory in bundles, and are prepared for use by a man and a boy. The boy cuts off part of the stalks with a pair of scissors, and the man fixes the teazles



[Hand-Raising.]

into oblong iron frames, which frames are afterwards to be fitted to the surfaces of the cylinders. The little elastic hooks become from time to time filled with wool, and require to be cleansed by means of a revolving brush applied to them.

The nap of the cloth being thus raised, it is 'cut,' or



[Cutting and fixing the Teazles.]

'cropped,' or 'sheared,' so as to produce an even surface. This used formerly to be always done by hand, the workman using shears with very long blades, and working over the whole surface of the cloth with a dexterity which nothing but long practice could impart. But by degrees various machines have been introduced for effecting this much more expeditiously, and the hand-shears are now but little used. The most generally employed form of cropping-machine is a spiral cutter working against a long straight blade, the spiral cutter being made to revolve rapidly, and the cloth being drawn between the two.

According to the quality of the cloth, so is it raised and cropped more than once, so as to produce varying degrees of fineness of surface. There are also a number of minor processes, all calculated to give an improved surface to the cloth: such as 'boiling' it, to impart a certain lustre; 'burling' or 'picking' it, to remove little imperfections; 'inking' any little white hairs or fibres which may occur in the dyed cloth; 'pressing' it between hot iron plates and smooth mill-board; 'steaming' and passing the cloth over cylinders covered either with brushes or a kind of plush, &c. All these processes are carried on in distinct parts of the factory, and require an extent of arrangement which a stranger at first thought would scarcely suppose—the *plate-room*, for instance, where the iron plates for pressing are heated in a large room containing six ovens for that purpose, each capable of heating several plates at one time, and each plate weighing as much as sixty-three pounds.

We have followed out the routine of processes pretty continuously, as a means of showing the relative connection of the whole in the arrangements of a large cloth-factory; but we must find a little room to notice some of the remarkable points accompanying the domestic system of manufacture.

In some cases a manufacturer—midway as to position between a factory owner and a domestic clothier—has the wool prepared for spinning in his own establishment, or in a mill, and then gives it out to the cottagers to spin and weave. In other cases, exemplified in many of the villages west and south of Leeds, the domestic clothier purchases his wool, mixes and assorts it according to the kind of cloth which he wishes to make, and sends it to a mill to be 'scribbled,' 'carded,' and 'slubbed.' If this mill be a 'company-mill,' that is, one owned by an association of small manufacturers, the work is conducted by a manager appointed by the owners, each one pays at a certain rate for the work done for him, and at the end of the year the profits are divided. The 'slubbed' wool is taken from the mill to the house of the clothier, there to be spun, wound, warped, and beamed, the clothier either working himself or superintending the working of others, according to his circumstances in life. When the cloth is woven, he sends it to the mill a second time, there to be 'scoured' and 'fulled:' and in this state he sells it, leaving the 'raising,' 'cropping,' and 'finishing,' together with the dyeing, if sold in the undyed state, to be done by the purchaser. The mill so used, however, may be the property of another person, who prepares the wool for the clothiers. Such is the case in respect to Armley Mill, one belonging to the same proprietors as the large establishment which we have just described. This mill is situated on the river Aire, quite beyond the smoke and bustle of Leeds, and its machinery is worked by two large water-wheels moved by the stream. In this mill are contained all the machines and arrangements for working the wool *before* the spinning and *after* the weaving; that is, for willying, scribbling, carding, and slubbing, and afterwards scouring and fulling. The clothiers send their wool, dyed or undyed, as they think best, to the mill, where it is prepared for spinning; then the spinning and weaving are done by the clothiers and their families; and, lastly, the scouring and fulling are done at the mill, preparatory to the sale at the cloth-halls.

To these cloth-halls we may next direct our attention. The domestic clothiers do not keep shops or warehouses, nor are there agents from the purchasers going from house to house through the villages, nor are there cloth-fairs or markets held in the villages. The clothiers,

every Tuesday and Saturday (which are the cloth-market days at Leeds, to which we may here confine our attention) attend at one or other of the two cloth-halls, and there meet the parties who may be disposed to purchase. The original market for woollen cloth was held on Leeds Bridge, a spot selected probably on account of its publicity; but it must have been a strange and most inconvenient arrangement, with the pack-horses and stalls blocking up the way. In 1684 the market was removed farther north, to the main street of Briggate. It was held early in the morning, and was closed by the ringing of the bell at the old chapel on the bridge; and as soon as the goods and benches were removed, the place was occupied by the country linen-drapers and shoemakers. This system continued till 1711, when the first cloth-hall was built. In 1755 a second hall superseded the first; and in 1758 and 1775 were built the two halls which have ever since been used as cloth-markets, and in which more cloth has probably been sold than at any other market-halls in the kingdom, or perhaps in the world. From Dyer's description, it would appear that a century ago barges on the river Aire, and laden pack-horses, were the means of carrying the cloth to and from market:—

> "Trade and business guide the living scene,
> Roll the full cars adown the winding Aire;
> Load the slow-sailing barges, pile the pack
> On the long tinkling train of slow-pac'd steeds."

The "Coloured Cloth-Hall," situated near the commercial buildings in the western part of Leeds, is a quadrangular brick building, inclosing an open area 360 feet long by 200 broad. It is divided into six departments, arcades, or streets, which receive distinctive names, such as "Change Alley," "Cheapside," &c. Each avenue contains two rows of stalls or stands, each stall measuring about two feet in width, and marked with the name of the person who rents or owns it, and who is always a country clothier. There are nearly two thousand of these stalls, each stall having behind it an open space where the clothier may deposit his stock of cloth, and the stall itself consisting simply of a small counter on which the cloth is to be displayed.

Such being the arrangement of the hall, the mode of conducting the traffic is as follows:—At a determinate hour on the mornings of Tuesdays and Saturdays, varying from half-past eight to half-past nine, according to the season, the hall is opened, and the country clothiers bring the cloth which they have for sale, mostly in carts. This cloth has been dyed in the wool, prepared, spun, woven, and fulled, but not sheared or finished. Each clothier knows his own stand, places himself with his goods behind it, and waits for customers. Some of these clothiers are men of considerable property, while others are in comparatively humble circumstances; but there is a kind of homely intelligence, an honest plainness, in the appearance of all. So much for the *sellers*. The *buyers* are either merchants who have no manufactories of their own, or persons who combine the characters of merchants and manufacturers. In the latter case, when the undressed cloth is purchased, the buyer finishes it in his own factory, and then consigns it to the woollen-drapers, shippers, or factors; but in the former case, the merchant who buys the undressed cloth sends it to a mill or factory to be finished, and then receives it back to his warehouse.

The purchasers at the hall are sometimes the merchants themselves, and at other times experienced persons in their establishments who are intrusted with the important office of 'buyer;' but in both cases the mode of proceeding is alike. The buyers go to the hall as soon as business commences, and walk through the 'streets' or avenues, looking at the cloth exposed on the stalls at either side. All the sellers know all the buyers, and each buyer is invited as he passes along to look at some 'olives' or 'browns,' or 'pilots,' or '6-quarters' or '8-quarters;' and the buyer decides in a wonderfully short space of time whether it will answer his purpose to purchase or not. "Mr. N., just look at these olives!" "How much?" "Six-and-eight." "Too high." Mr. N. walks on, and perhaps a neighbouring clothier draws his attention to a piece or 'end' of cloth (an 'end' being a technical name for about twenty-five yards of cloth). "What's this?" "Five-and-three." "Too low." The "too high," as may be supposed, relates to the price per yard; whereas the "too low" means that the quality of the cloth is lower than the purchaser requires. Another seller accosts him with—"Will this suit you, Mr. N.?" "Any English in it?" "Not much; it is nearly all foreign:" a question and answer which exemplify the disfavour into which English wool has fallen in the cloth trade. As Mr. N. proceeds, three or four clothiers call to him at once, or perhaps he has an entry in his book which leads him to ask for a particular kind of cloth; and he then goes from one stall to another till he meets with it. The clothier may ask perhaps two-pence or four-pence per yard more than the buyer would like to give; and in such cases a bargain is generally struck at an intermediate price, though the clothier frequently adheres resolutely to his original price. When the bargain is concluded, which may be for all, or for only a part of the cloth, the purchaser writes with a red pencil a few marks on the corner of the cloth, and walks away. This kind of traffic continues for one hour and a quarter, at which time the hall is closed, after business to the amount of many thousands has been transacted.

Immediately on the closing of the "Coloured-Cloth Hall," the "White Cloth Hall," situated in a more eastern part of Leeds, is opened; and the buyers generally proceed from the one to the other, unless the buyers of dyed cloth do not want to purchase any undyed cloth, or *vice versâ*. This White-Cloth Hall is rather smaller than the other, but is arranged on a similar plan, and the business is similarly conducted. The undyed woollen cloth has a yellowish white colour, and is afterwards dyed according to the purposes to which it is to be applied.

When the buyer has made his purchases, he proceeds to the warehouse belonging to himself or his employers; and soon afterwards the clothiers from whom he may have purchased arrive with the cloth. Every 'piece' or 'end' is first measured, and the length, width, price, and name of the seller entered in a book by a clerk. The cloth is then taken into another room, and examined from end to end, one person looking at it by a strong light from a window, and another looking through it from behind; and there is a certain scale of allowances agreed on for any defects which may be found. When the measuring and the inspection are completed, the clothiers at once receive payment, and depart to buy wool for a new supply of cloth. In many of the large firms cloth is not only made throughout in factories, but purchases are also largely made at the cloth-halls. Such is the case with respect to the firm to whose kindness we are indebted on the present occasion; at a third large establishment, in the northern part of Leeds, all the arrangements are conducted respecting the inspection, payment, and warehousing of the cloth purchased at the two cloth-halls; and the cloth so purchased is afterwards finished at the factory farther southward.



[Sir Roger de Coverley at the Temple Stairs.]

SIR ROGER DE COVERLEY. No. XI.

[From 'Spectator,' No. 383, by Addison.]

"As I was sitting in my chamber, and thinking on a subject for my next 'Spectator,' I heard two or three irregular bounces at my landlady's door, and upon the opening of it, a loud cheerful voice inquiring whether the philosopher was at home. The child who went to the door answered, very innocently, that he did not lodge there. I immediately recollected that it was my good friend Sir Roger's voice, and that I had promised to go with him on the water to Spring-Garden (Vauxhall) in case it proved a good evening. The knight put me in mind of my promise from the bottom of the staircase, but told me that if I was speculating he would stay below until I had done. Upon my coming down, I found all the children of the family got about my old friend; and my landlady herself, who is a notable prating gossip, engaged in a conference with him; being mightily pleased with his stroking her little boy on the head, and bidding him to be a good child and mind his book.

"We were no sooner come to the Temple Stairs but we were surrounded with a crowd of watermen, offering us their respective services. Sir Roger, after having looked about him very attentively, spied one with a wooden leg, and immediately gave him orders to get his boat ready. As we were walking towards it, 'You must know,' says Sir Roger, 'I never make use of anybody to row me that has not lost either a leg or an arm. I would rather bate him a few strokes of his oar than

not employ an honest man that has been wounded in the queen's service. If I was a lord or a bishop, and kept a barge, I would not put a fellow in my livery that had not a wooden leg.'

"My old friend, after having seated himself, and trimmed the boat with his coachman, who, being a very sober man, always serves for ballast on these occasions, we made the best of our way for Vauxhall. Sir Roger obliged the waterman to give us the history of his right leg; and, hearing that he had left it at La Hogue, with many particulars which passed in that glorious action, the knight, in the triumph of his heart, made several reflections on the greatness of the British nation; as, that one Englishman could beat three Frenchmen; that we could never be in danger of popery so long as we took care of our fleet; that the Thames was the noblest river in Europe; that London Bridge was a greater piece of work than any of the seven wonders of the world; with many other honest prejudices which naturally cleave to the heart of a true Englishman.

"After some short pause, the old knight, turning about his head twice or thrice to take a survey of this great metropolis, bid me observe how thick the City was set with churches, and that there was scarce a single steeple on this side Temple Bar. 'A most heathenish sight!' says Sir Roger: 'there is no religion at this end of the town. The fifty new churches will very much mend the prospect; but church work is slow, church work is slow.'

"I do not remember I have anywhere mentioned in Sir Roger's character his custom of saluting everybody that passes by him with a Good-morrow or a Good-night. This the old man does out of the overflowings of his humanity; though, at the same time, it renders him so popular among his country neighbours, that it is thought to have gone a good way in making him once or twice knight of the shire. He cannot forbear this exercise of benevolence even in town when he meets with any one in his morning or evening walk. It broke from him to several boats that passed by us upon the water; but, to the knight's great surprise, as he gave the Good-night to two or three young fellows a little before our landing, one of them, instead of returning the civility, asked us what queer old put we had in the boat, with a great deal of the like Thames ribaldry. Sir Roger seemed a little shocked at first; but at length, assuming a face of magistracy, told us that, if he were a Middlesex justice, he would make such vagrants know that her Majesty's subjects were no more to be abused by water than by land.

"We were now arrived at Spring-Garden, which is excellently pleasant at this time of the year. When I considered the fragrance of the walks and bowers, with the choirs of birds that sung upon the trees, and the loose tribe of people that walked under their shades, I could not but look upon the place as a kind of Mahometan paradise. Sir Roger told me it put him in mind of a little coppice by his house in the country, which his chaplain used to call an aviary of nightingales. 'You must understand,' says the knight, 'there is nothing in the world that pleases a man in love so much as your nightingale. Ah, Mr. Spectator, the many moonlight nights that I have walked by myself, and thought on the widow by the music of the nightingale!'

"We concluded our walk with a glass of Burton ale and a slice of hung beef. When we had done eating ourselves, the knight called a waiter to him, and bid him carry the remainder to the waterman that had but one leg. I perceived the fellow stared upon him at the oddness of the message, and was going to be saucy; upon which I ratified the knight's commands with a peremptory look."

JUDICIAL ASTROLOGY.

PART IV.

[Concluded from page 432.]

We shall now take a very cursory view of the doctrine of decumbitures. A decumbiture is a scheme of the heavens erected for the time at which a person takes to his bed in a disease, and by which the prognostics of recovery or death are discovered. As the precise time when a question starts from the mind is the birth of the question, so is the precise time at which the patient takes to his bed the birth of the disease; a most illogical, though a satisfactory astrological conclusion. In a decumbiture the ascendant and its lord are the significators of the sick party. The sixth house, the lord thereof, the planets therein, and signs they occupy, together with the Moon and her place, include the disorder and the parts of the body affected. The seventh house denotes the physician, and the tenth his medicine. The fourth house shows whether the disease will terminate speedily or tardily: fixed signs prolong it: common signs change it; moveable signs end it quickly for life or death. The lord of the ascendant and ☽ combust of the ☉ (*i. e.* within 8° 30′ of the body of the ☉, in the same sign) denotes death, unless ♃ or ♀ cast their △ or ✶ aspect to them. If the lord of the house of death be fortified above the earth, and the lords of the first and sixth be debilitated under the earth, there is little hope of recovery. If the lord of the ascendant and the ☽ aspect each other by □ or ☍, especially at night, the patient will die; but if the lord of the ascendant apply to a △ or ✶, he will live.

By an inspection of a decumbiture the cause of the disease can be accurately ascertained without seeing the patient or asking any questions; and thus the medical professor, if he be an astrologer (and only such, says Culpeper, are fit to be physicians) can—

> "Feel the pulses of the stars,
> To find out agues, coughs, catarrhs."

If ♄ be lord of the ascendant, and posited in the sixth house, the disease was caused by cold or much grief. If ♃ be the lord of the ascendant, and in the sixth, the illness proceeded from a cold caught after heat occasioned by mirth. If ♂ be so circumstanced, the disease was caused by anger, fretting, or some unlucky blow. If ♀ be lady of the ascendant, and posited in the sixth, the patient is love-sick, or his ailment proceeds from riotous jollification. If ☿ be circumstanced as above, the disease has been induced by fear or over-study. If ☽ be lady of the ascendant, and in the sixth, the disorder is occasioned by taking cold after getting wet, or by travelling.

When astrology was in vogue, it was very common for persons to have recourse to the doctrine of decumbitures to ascertain whether a disease would terminate favourably or otherwise.

This practice had frequently a very injurious and sometimes a fatal effect upon the mind of the patient. A professor, one Richard Ball, who published 'An Astro-physical Compendium, &c.,' in describing a decumbiture he had drawn up, says—"Saturn, having dignities in the sixth, the house of sickness, and being posited in the eighth, the house of death, and almost in conjunction with the Sun, the lord of the fourth, I judged the distemper would prove mortal, the more especially as the moon separated from a quartile of Mars to a conjunction with Saturn, who is naturally an enemy to life, and in this figure lord of the house of death, which are great arguments of sudden death. I, therefore, sent the querent word that she might prepare herself for another world, having (according to natural causes) but a short time to continue in this. She expired two days afterwards, when the moon came to the

body of Saturn, who was lord of the eighth, and in the eighth at the time of asking the question." That a sick and superstitious woman should die two days after receiving such a prophetic warning is not at all surprising, even though the Moon had applied to the body of Jupiter instead of Saturn, for the influence of the imagination must have greatly exceeded that of the stars.

The planets not only govern all the diseases "that flesh is heir to," but also all curative and other herbs; indeed, the whole vegetable kingdom is under their rule. How or when the influence of the planets over the respective plants and herbs, which they are said to govern, was discovered, it would be useless now to inquire. Culpeper, the author of the well-known herbal, seems to have arrived at a knowledge of this department of planetary domination by a sort of inductive reasoning that is much more curious than consequential. Speaking of the government and virtues of wormwood, he says—"Will you give me leave to be a little critical? I must take leave. Wormwood is an herb of Mars, and if Pontanus say otherwise, he is beside the bridge. I prove it thus: What delights in martial places is a martial herb; wormwood delights in martial places (for about forges and iron-works you may gather a cartload of it); *ergo* it is a martial herb. They say a mouse is under the dominion of the moon, and that is the reason they feed in the night: the house of the Moon is Cancer. Rats are of the same nature with mice, but they are a little bigger. Mars receives his fall in Cancer: *ergo* wormwood, being an herb of Mars, is a present remedy for the biting of rats and mice. Moths are under the dominion of Mars: therefore wormwood laid among clothes makes a moth scorn to meddle with them, as much as a lion scorns to meddle with a mouse, or an eagle with a fly. Who dares say Mars doth no good? Why should men cry out so much upon Mars for an unfortunate (or Saturn either)? Did God make creatures to do the creation a mischief? This herb testifies that Mars is willing to cure all the diseases he causes: the truth is, Mars loves no cowards, nor Saturn fools, nor I neither."

Culpeper's logic may be laughed at; but it is, nevertheless, as good as any that can be found in support of the position which it is intended to establish.

The same pretended principles, with a few variations of the absurdities, were applied to what was called nautical astrology, or the events of ships.

The next department of astrology has been termed natural, as it relates to the predicting of natural events, as distinguished from moral effects proceeding from the will of man. To this part of the art belong all prognostications of the weather, winds, storms, hurricanes, thunder, floods, earthquakes, &c. Goad (vide his 'Aphorismi Astro-Meteorologici') maintains that inundations may be foretold and an infinity of phenomena explained and predicted from the situation and habitudes of the planets, from their retrograde motions, the fixed stars in the constellations, &c. On this branch of astrology, although the ingenious Mr. Boyle has an apology for it in his history of the air, it will not be necessary to say much, as its numerous rules are not founded on any established principles. Of course we shall not give what astrologers call an 'Apertio Portarum' for the whole year, but merely select a few of the choicest rules. Weather prophets have always been remarkable for the failure of their predictions, which we shall not be surprised at when we know the rules they work by. The planet Saturn is the causator of eastern winds, Jupiter of northern, Mars of western, Venus of southern, Mercury of different winds according to his aspect, and the Sun and Moon of east and west winds. Venus, Mercury, and the Moon are rainy planets. The moist signs are ♋, ♌, ♏, ♒, ♐, ♓; the latter end of ♈ and ♑ and the beginning of ♉ are also moist; and planets, particularly the rainy ones, when posited in these places produce much rain. When the Sun shall be in eighteen degrees of Scorpio, and Venus in a moist place, as much rain may be expected as will inundate the low grounds. When the Moon is with Venus in ♈, ♎, ♏, or ♓, there will be showers, thunder, and lightning. With respect to the winds, particular regard must be had to the place of Mercury and his application to other planets; for if he apply to Saturn, expect strong winds, a dark air, and some rain; if he apply to Jupiter, gentle winds without rain; if to Mars, warm winds; if to the Sun, hot and insalubrious winds: and if to Venus, moist winds. If Mercury be stationary, retrograde, or going out of one sign into another, strong winds will follow. Nothing can be much more difficult than to predict, from the foregoing rules, the quarters whence the winds will blow; and astrologers seem to be aware of this, for in Moore's 'Almanac' for 1842, the point from which the wind will blow is only once stated, and that is when Jupiter and Saturn entered into their true ecliptical conjunction on Jan. 26, on which occasion severe easterly winds were to be expected. Now, as Saturn causes the wind to blow from the east and Jupiter from the north, if their forces had been equal, the wind would have been north-east; but the presumption is, that as the conjunction took place in Capricornus, the night house of Saturn, in which Jupiter has his detriment, Saturn's essential dignities enabled him to overcome the debilitated power of Jupiter, and induce the wind to blow from the east. If the planets were to exert their power of producing winds simultaneously, it would be difficult, from such a confluence to determine which had the predominance. We have seen, according to the rule, that when Mercury applies to a conjunction with the Sun, that hot and insalubrious winds are produced; but when Mercury applied to a conjunction with that luminary, on the 17th of January, 1842, we had no hot insalubrious winds.

The conjunction of the Moon and Mars in moist signs produces rain, in fiery signs great drought; but a conjunction of the ☽ and ♂, in the fiery sign ♈, which occurred in March, 1842, was not followed by a great drought: according to Moore, the weather at that time was squally, with sleet or cold rain. These instances are sufficient to show that the causes of mutation in the weather are not to be sought for in astrological aphorisms. A weather prophet in Egypt must draw very different inferences from the location of rainy planets in moist signs, from those which are drawn by weather prophets in England.

The only remaining branch of astrology is the political, which we shall forbear to touch upon further than to observe that it is very fruitful of predictions, abundant specimens of which may be found in Moore's 'Almanac,' couched in something like the following terms:—"The planetary positions lead us to believe that affairs of great importance are now upon the stage of the world, especially in the Oriental parts. The grim King of Terrors is stretching forth his gigantic arms; he strikes down one of the greatest."

Having thus far explained the leading principles of astrology, we shall notice a few of its absurdities, inconsistencies, contradictions, and fallacies, from the application of its rules. And, first, of lucky hours. In the aphorisms on the events of lotteries, insurance, &c., as given in Ramsay's 'Elections,' we find that the first twelve hours after the conjunction of the sun and moon are unfortunate, the next seventy-two are lucky, the following twelve unlucky, and the subsequent seventy-two again fortunate, and so on throughout the month. This aphorism implies a contradiction: it is laid down for the special guidance of persons engaged in gam-

bling transactions; and it is evident that if two persons sit down to any game, the hour which is lucky to the winner is unlucky to the loser. Friday is generally considered to be an unlucky day: many persons, not otherwise superstitious, do not like to commence any business of importance on a Friday; and we have read a very interesting tale, founded on this popular superstition. But Friday, astrologically considered, is not an unlucky day; it is under the rule of Venus. It is true that Saturn rules the fourth and eleventh hours after sunrise, and the sixth after sunset; and Mars rules the sixth after sunrise and the first after sunset; and as these hours differ in their duration according to the difference in the length of the day and night, you may chance, unless you calculate accurately, to fall into an unlucky hour in a lucky day.

In horary questions, the answer to the same inquiry will vary with the time of the day. If the querent should desire to know to what part of the world he must direct his course in order to obtain riches or improve his health, the rule is, to direct him to that quarter in which the promising planets are located; if they be in the first house at the time he makes the inquiry—suppose eight o'clock in the morning, he must go eastward; but as the heavenly bodies pass through each house in about two hours on the average, if the wife of the querent were to go at two o'clock in the afternoon to ask the same question, she would be told to go southward; and if another member of the family went at eight in the evening, the direction would be to go westward. Lilly, aware of these discrepancies, has laid down another rule, by which any mutation of the points of the compass, from an alteration of time, is prevented. By this arrangement Aries always represents the east, even though it be in the west; and Libra must always be understood to be in the west, although really in the opposite point. Lilly has here well exemplified the ancient adage of falling into Charybdis by endeavouring to avoid Scylla. If a querent desire to know where anything is hidden, lost, or mislaid, the rule is to see in what signs the significators of the things lost are posited, and if they should be in fiery signs, the lost or hidden things are near the chimney or fire-place; if in watery signs, they are in the buttery, dairy, wash-house, or near the cistern. Now Lilly has fixed the fiery signs in the east; but there are many houses which have no fire-place in the east; he has also placed the watery signs in the north; the wash-house, cistern, &c. ought therefore to be in the north, but they are often in the other quarters—so that the rules are inconsistent and nugatory. Cato used to say that the most surprising thing to him was how one soothsayer could look another in the face without laughing. This might as aptly have been said of astrologers.

We have thus given an exposition of astrology, with its absurdities, inconsistencies, contradictions, and fallacies. So prominent and palpable must they, indeed, appear, that many persons may wonder that anything so ridiculous should ever have obtained credence. But it must be borne in mind that astrology was for ages veiled in mystery—even the angles of the twelve houses, and the characters of the signs and planets had something mystical about them; that till the eighteenth century there was a prevalent belief in occult powers and practices—in necromancy, incantations, and the power of witches to destroy persons by moulding their images in wax or clay.

The belief in astrology was not more absurd than this belief in witchcraft, which was entertained by the succeeding monarch, James I. But astrology and witchcraft soon after lost the hold they had on men's minds. Astrology declined with Lilly; the "wits of Charles" levelled the shafts of their ridicule at it, and it never rallied again. Lilly was, 'by far, the most famous of our English astrologers;' he was consulted both by Charles I. and the parliament, and made money by predicting success to both parties. Butler, in his 'Hudibras,' ridicules him under the names of "English Merlin" and "Erra Pater." The House of Commons had so great a regard for his predictions, that the author of 'Mercurius Pragmaticus' (No. 26) styles the members the sons of Erra Pater.

Lilly, a little before his death, adopted for his son, by the name of Merlin, junior, one Henry Coley, a tailor, and gave him at the same time the impression of his almanac, after it had been printed for thirty-six years. Coley published some astrological works, one under the title of 'Coley's Key New Filed;' but Merlin, junior, never arrived at any great eminence. The character of Foresight, in Congreve's comedy of 'Love for Love,' was a banter upon Lilly, and Valentine, in his feigned madness, calls him Erra Pater. Lilly's fame in England was, perhaps, as great as that of Nostradamus in France: the predictions of both were sometimes fulfilled. Lilly could not fail of being sometimes right by predicting the same fortune to adverse parties; and Nostradamus published so many centuries of prophecies—many under allegorical allusions—that it is not surprising that a few should coincide with subsequent events. He drew up and signed the nativity of M. Suffren, which the Abbé Pluche says was entirely false. "It may be here remarked, that if out of a hundred predictions there be one fulfilled, that one is blazoned abroad till every one hears and admires the wonder; whilst the ninety-nine failures pass unnoticed, amidst the crowd of common events, into oblivion.

When astrology lost the poetry of its character, its antiquity could no longer render it venerable; it became a dull, gross error, filling men's minds with unreasonable hopes and groundless fears. Men forebore doing anything till they were under a favourable position of the stars. The ascendant point of such a constellation produced this effect, and the culminant point of the same or another constellation corrected that. Prudence and wise precautions, founded on experience, were superseded by an observance of critical days and fortunate hours, by superstitious forms and puerile practices. "Astrology," says the Abbé Pluche, "completed the ruin of every virtue. It quieted criminal minds by making them cast upon the predominant planet the evil which was but the result of their own depravity. Irreligion was hardly carried to a greater degree anywhere than at the court of Henry II. and that of Henry III. Never were astrologers better paid, never horoscopes in greater vogue than at that time. This disease of predictions was likewise contagious under Henry IV. and Louis XIII. De Thou, Mezerai, and many other great geniuses had from their infancy been infected with this evil; nor were they ever thoroughly cured of it."

But the reign of astrology must now be considered as terminated in all enlightened countries, and all attempts to restore it to its pristine sovereignty as vain and ineffectual. Its throne, which was raised when the earth was believed to be the centre round which all the heavenly bodies revolved, was shaken to its foundation by the establishment of the solar or Copernican system, and the discovery of the modern planets, for whom, though no doubt equally influential with the others, no *houses* and no dominion remained. Though fostered by Moore, and Zadkiel, and Raphael, no real importance can ever be again attached to it. People may observe and smile at curious coincidences, but predictions of astrology will in future rank no higher than those derived from the sediment of a coffee-cup or the lines on the hand explained by a gipsy.



[Hall in the Tyrol.]

THE TYROL.

This country, of which we have already given occasional notices, is one of the most interesting and picturesque regions in all Europe. The valleys are warmer, more fertile, and the vegetation more luxuriant than those of Switzerland, as we have noticed in Nos. 209, 211, and 356 in describing Innsbruck and the valleys of the Merin and the Non; though on the whole even more mountainous, not more than one-tenth of the entire surface being capable of arable cultivation. Its waterfalls, both in number, height, and beauty,* also exceed those of Switzerland, that of the Adige, above Meran, being considered to exceed even that of the Rhine at Schaffhausen; and it is only in the magnificent expanse of its lakes and the sterile sublimity of some of its higher mountains that Switzerland excels the Tyrol.

The Tyrol has long formed a part of the hereditary dominions of the house of Austria, and the glorious efforts made by the inhabitants to resist their transfer to Bavaria, in 1809, have been narrated in No. 209. It is of an extremely irregular form, the Vorarlberg stretching out like a peninsula as far as the Lake of Constance, in 9° 32′ E. long., while on the opposite side the Austrian province of Salzburg indents the Tyrol to nearly 12° E. long., although its frontiers extend on each side of the indentation to Lofer, on the Bavarian frontier, in 12° 45′, and to Oberdrauberg on the Austrian, in 12° 55′. Its northern frontier joins Bavaria in its whole extent, and its extremest point is a little beyond Kufstein, in about 47° 48′ N. lat.; the southern, south-western, and south-eastern frontiers join Italy, being separated from the Lombardo-Venetian kingdom by the range of the Carnic Alps. At its southern extremity it reaches 45° 36′, crossing the northern end of the Lago di Guarda, and reaching a few miles farther south. Nearly one-tenth of the surface is calculated to be continually covered with snow. In extent it is about double the size of Yorkshire, and the population is reckoned at about 830,000.

* See No. 220, for an account of that of Golling.

The Tyrolian Alps form the eastern portion of the Central or Rhætic Alps, and do not rise so high as the Western Alps in Mount Rosa or Mount Blanc, but they are as high as the western portion of the Rhætic Alps in Graubundten. The most elevated parts lie along the western boundary-line, south of the Inn river, and in the great chain which runs through the country from west to east, dividing the waters which run northward to the Danube, from those that flow southward to the Adriatic, or eastward to the river Drau. The western chain, as already observed, runs uninterruptedly from the Lake of Idro to the Ortler Spitz. South of 46° 8′ it does not attain the region of perpetual snow, and probably does not exceed seven thousand feet above the sea-level; but near 46° 8′ it rises in Monte Adamello to more than eleven thousand feet, and from this summit to the Ortler Spitz (46°30′), hardly any portion of the range is free from snow even in the latter part of the summer. The general elevation of this range probably exceeds nine thousand feet above the sea. The Ortler Spitz is the highest summit of the Rhætic Alps, being twelve thousand eight hundred and fifty-five feet above the sea; some authorities say above fourteen thousand feet; but the variations probably arise from the difficulty in obtaining a correct base-line and the uncertainty of barometrical measurement. It is surrounded by other summits, and is always covered with snow.

The largest rivers of Tyrol are the Inn and the Etsch. The Inn rises in the western part of the Rhætic Alps, in Engadin, and runs about fifty miles before it enters Tyrol by a very narrow valley at Finstermunz. Its course within Tyrol is about one hundred miles, and it becomes navigable for small river-boats at Telfs, about twenty miles above Innsbruck, and for larger river-boats at Hall, about eight miles below Innsbruck. Below Kufstein it leaves Tyrol and enters Bavaria, falling ultimately into the Danube at Passau. The Etsch originates in the mountains west of the Ortler Spitz, and runs to the eastward until it is joined by the Passener rivulet, when it turns to the south-east. At its junction with the Eisack below Botzen it

turns southward and begins to be navigated. At Borghetto it leaves Tyrol and enters the Lombardo-Venetian kingdom: it is hence known as the Adige, and falls into the Adriatic. The navigation of these rivers is difficult, and frequently interrupted by their rapidity, especially after the melting of the snow in the mountains.

The deep and wide valley of the Upper Etsch (Adige), called Vintschgau, separates the mountain-masses of the Ortler Spitz from the mountain-range which traverses Tyrol from west to east. This range is divided into two high and elevated mountain-masses, which are divided by a large and wide depression of the mountain, which occurs near 11° 30′ E. long., and through which the road over the Brenner passes from Germany to Italy. The mountain-region west of this road consists of two extensive and very elevated mountain-masses, which are connected by a high ridge. The western mountain-mass is called the mountains of the Platey Kögl, or of the Great Oetzthaler Ferner, and the eastern is named the mountains of the Winacher Ferner. The mountains of the Platey Kögl occupy nearly the whole country between the Inn river on the west and the Achen river on the east, a space of nearly thirty miles from south to north, and twenty miles from west to east. A considerable portion of this tract is always covered with snow, from which rise numerous pinnacles, among which the highest are Mount Gebatsch, twelve thousand two hundred and seventy-six feet; the Similaun Spitz, eleven thousand eight hundred and fifty-nine feet; and the Great Oetzthaler Ferner, ten thousand four hundred and thirty-four feet above the sea-level. This is one of the most broken portions of the Alps, and the snowy masses are only furrowed by two deep and very narrow valleys. The mountains of the Winacher Ferner, or the eastern part of the region, are connected with those of the Platey Kögl by a high and narrow ridge, which only in a few places is free from snow in summer. The Winacher Mountains also rise above the snow-line, but the mass is less extensive than that of the Platey Kögl. Several summits rise above ten thousand feet, among which are the Kitzhamp, the Winacher Ferner, the Winter Stuben, and the Bock Kögl.

The depression which occurs east of the Winacher Mountains is of considerable extent, for no summit always covered with snow occurs in a space extending more than eighteen miles from west to east. No summit of this part of the Tyrolian Alps probably exceeds seven thousand five hundred feet in height; and in the middle, near 11° 30′ E. long., it sinks much lower: the road over the Brenner is, at its highest level (47° N. lat.), not more than four thousand three hundred and seventy-four feet above the sea-level. This is the lowest mountain-road across the Alps, and has accordingly become the most frequented line of commercial intercourse between Germany and Italy. This road may be considered as beginning at Innsbruck in the valley of the Inn, whence running in a southern direction it ascends the valley of the Sill or the Wipthal to its source near the post-house of Brenner, where it attains its highest level. Descending from it the road enters the valley of the Eisack above Sterzing, and follows the course of that river to its junction with the Etsch (Adige) below Botzen, whence it continues in the valley of Etsch, to Trent, Roveredo, Avio, and Verona. A few miles above Verona it emerges from the mountains and enters the Plain of Lombardy. Innsbruck is about one thousand nine hundred and twenty and Trent nine hundred and sixty feet above the sea-level.

As great portion of the country, probably one-tenth, is always covered with snow, whilst its most southern valleys are hardly five hundred feet above the sea-level, the climate of Tyrol must differ greatly in different places. At Innsbruck the mean temperature of the winter is 30·5°, or nearly 8° less than at London; and that of the summer is 64°, or about 2½° more than at London. The mean annual temperature is 49°, or 1° less than at London. At Trent the mean annual temperature is 53°, or nearly 3° higher than at London.

All those parts which on the north are seven thousand five hundred feet, and on the south eight thousand five hundred feet above the sea-level, are always covered with snow. Lower down, to an elevation of six thousand feet above the sea, snow is found all the year round in places which are not much exposed to the sun, but in other places the declivities of the mountains are covered with grass and flowers. In the region between six thousand and five thousand feet trees do not grow, but there are some bushes, between which the soil is covered with grass that serves for pasture during two or three months in summer. There are no houses inhabited all the year round at this elevation. Fir-trees occur only at an elevation of between five thousand and four thousand feet, where a few permanent habitations are found, and some potatoes and vegetables are cultivated. The winter lasts in this region eight or nine months. Agriculture is carried on with success in all places below four thousand feet. Rye and barley are grown, and potatoes to a considerable extent, though they do not grow large when planted above three thousand feet. Apple and pear trees succeed at the elevation of four thousand feet, and even somewhat higher, but plum-trees only to three thousand eight hundred, and walnut-trees to three thousand six hundred feet. The beech is found between three thousand and four thousand feet, and the oak between one thousand eight hundred and three thousand feet above the sea-level. Wheat does not succeed above three thousand feet, and vines only between eight hundred and one thousand eight hundred feet.

[To be continued.]

USEFUL APPLICATIONS OF THE ASH-TREE.

The name of the *Ash* has, somewhat confusedly, been applied to two trees occupying a very different place in botanical classification: the one being the *Common Ash* and others of a similar genus, known by the general name of *Fraxinus*; and the other the *Mountain-Ash*, belonging to the genus *Pyrus*. The useful purposes to which these two kinds are applied differ as much as the appearance of the trees.

The Common Ash is a fine forest-tree, rising to a height of from eighty to a hundred feet. It is indigenous to most parts of Europe, and to some parts of America and Asia. The tree was known to the Greeks and the Romans, the latter of whom made their spears of its wood; it was also valued by them as a material for agricultural implements, and for certain medicinal qualities.

The timber of the ash is the product of most value. Though not so durable as the matured or heart wood of the oak, it surpasses both it and all our other indigenous trees in toughness and elasticity of fibre, on which account it is almost universally used in the fabrication of all articles where these qualities are particularly required. The texture of the wood is alternately compact and porous; and where the growth has been vigorous, the compact part of the annual layers bears a greater proportion to the porous, and the timber is comparatively tough, elastic, and durable. From its great elasticity and toughness, it is much employed in all those parts of machinery which have to sustain

sudden shocks, such as the felloes, teeth, and spokes of wheels, beams of ploughs, &c.; but since the use of iron has become so general in the manufacture of instruments and machines, the value of the ash has somewhat diminished. Still, however, it ranks among the most valuable of our timber-trees, especially for the purposes of the coachmaker, the wheelwright, and the maker of agricultural implements. It is much used for kitchen tables, on account of two qualities which the housewife can well appreciate, viz., that it admits of being well and readily scoured, and that it does not endanger the scourer's hand by splintering. It was formerly much used in staircases, such as that at Wroxton Abbey. Milkpails, in many parts of England, are made of thin boards sawed lengthwise out of the ash-tree, each rolled into a hollow cylinder, with a bottom fixed to it: a mode of employment which strikingly illustrates the elasticity of the wood. The roots and the knotty parts of the trunk are in demand by cabinet-makers, for the curious dark figures formed by their veins, which have a remarkable appearance when polished. This quality was known two centuries ago; for Evelyn says that "some ash is so curiously cambleted and veined, that skilful cabinet-makers prize it equally with ebony, and call it green ebony."

Among other uses to which this timber is applied, Mr. Loudon mentions the following:—It is an excellent wood for oars, blocks, and pulleys. Few other trees become useful so soon, the wood being fit for walking-sticks at four or five years' growth, and for handles for spades and other instruments at nine or ten years' growth. An ash-pole three inches in diameter is, indeed, one of the most valuable pieces of timber, for its bulk, that any tree can furnish. For hop-poles, hoops, crates, basket-handles, rods for training plants or for forming bowers, light hurdles, and for fence wattlings, the branches of ash, in various stages of growth, are particularly valuable. In the neighbourhood of the Staffordshire Potteries the ash is cultivated to a great extent, and cut every five or six years for crate-wood, which is in great demand in the Pottery districts. In Kent, and in various places in the neighbourhood of London, the most profitable application of the young ash is for walking-sticks, plant-rods, hoops, and hop-poles. For the latter purpose coppice-woods are cut over every twelve or fourteen years, according to the nature of the soil; and for the former purposes, every five or seven years. The ash makes excellent fuel, burning, even when nearly cut, with very little smoke; and it is said to be the best of all woods for smoke-drying herrings.

The ashes of the branches and shoots of the ash-tree afford a very good potash. The bark is used for tanning nets and calf-skins. The leaves, in some places, are used as food for cattle in autumn, and in others in spring; they are also used for adulterating tea. The leaves and shoots, eaten by cows, are said to give the milk and butter a rank taste; but on the other hand the Romans are said to have recommended ash-leaves as being next to elm-leaves as fodder. Mr. Selby, Mr. Loudon, and Mr. Sydney all agree in thinking that the popular opinion on this matter is erroneous. Mr. Selby observes: "The leaves of the ash, when eaten by cows, are generally supposed, but we believe erroneously, to communicate an unpleasant flavour to the milk and butter: we have not been able to detect anything unpleasant in regard to our dairy, although the cows have access to several ash-trees growing in and around their pasture." ('British Forest-Trees.') Mr. Loudon's words are:—"In moist pastures, interspersed with or surrounded by numerous trees in hedge-rows, the leaves, after dropping in the autumn, communicate a bitter taste to the water both in the ditches and ponds, and possibly also to the milk of cows; but this does not hold good more with respect to the ash than to other trees: indeed, the most objectionable is the oak, the leaves of which in autumn give a decidedly bitter taste both to the water and milk." Mr. Sidney of Morpeth, in a letter to Mr. Loudon, observes: "The statement made by many writers, that the butter made from the milk of cows which have eaten ash-leaves has a disagreeable taste, is certainly not founded in fact. Much excellent butter is made in this neighbourhood, on farms where it would be impossible to prevent the cows from feeding upon the leaves of the ash; and yet I have never met with a farmer's wife or dairy-woman in the neighbourhood of Morpeth who had ever heard of the supposed injury done to butter."

Evelyn states that the seed, or 'keys,' as they are termed, were in his day, while green, pickled and preserved as a "delicate salading;" these seeds have an aromatic and rather bitter flavour, and are infused by the Siberians in the water used for drinking, to give it a flavour. The medicinal quality of the seeds seems to have been known and highly extolled by the Arabian, Greek, and Roman physicians; dropsy and calculus being two diseases for which it is said to be valuable.

The sap of the ash-tree is considered by some French physicians to be an excellent remedy for the gangrene; and for this purpose the sap is procured either from the leaves by maceration, or from the greenwood by putting one end of a branch into the fire, and collecting in a spoon the sap which exudes at the other end.

There is another species of ash, called the *European Flowering Ash*, or *Manna Ash*, which yields abundantly a sap whence one of its names is derived. This tree is a native of the south of Europe, and rises to a height of about twenty or thirty feet. The sap extravasates from them, and, on concreting, becomes a mild and mucilaginous substance, which is extensively sold in Italy as manna. The chief supply comes from Calabria and Sicily, where the manna runs of itself from the trunks of some trees, while from others it does not flow unless a wound be made in the bark. Those trees which yield the manna spontaneously grow in the most favourable situations; and the sap runs from them spontaneously only during the greatest heats of summer. It begins to ooze out about midday, in the form of a clear liquid, which soon thickens, and continues to appear till the cool of the evening; when it begins to harden into granules, which are scraped off the following morning. When the night has been damp or rainy, the manna does not harden, but runs to the ground and is lost. This kind is called "manna in tears," or "manna lagrimi," and it is as pure and white as the finest sugar. About the end of July, when the liquid ceases to flow of itself, incisions are made through the bark and soft wood; and into these incisions slender pieces of straw or twig are inserted, on which the manna runs, and, coating over them, hardens on them. This is the common manna of the shops, which is thus collected in the form of tubes, and it is called "manna cannoli." Another and inferior sort is procured by making an oblong incision in the trees, in July or August, and taking off a piece of the bark about three inches in length by two in breadth. This kind, called "manna grossa," is the coarsest; but as it is produced with least trouble, and in great abundance, it is also the cheapest. Sometimes, instead of cutting out a piece of bark, and leaving the wound open, two horizontal gashes are made, one a little above the other; in the uppermost of which is inserted the stalk of a maple leaf, the point of the leaf being fixed in the lower gash, so as to form a sort of cup for the reception and preservation of the manna. The greater part of the manna of commerce is procured in the latter manner; and it is imported in chests, in long pieces

or granulated fragments of a whitish or pale yellow colour, and slightly transparent. The inferior kind is of a dark brown colour, in adhesive masses, and is moist and unctuous when felt. Manna from the ash has a peculiar odour and a sweetish taste, accompanied with a slight degree of bitterness. It is considered aperient; was formerly much used in medicine; but is now chiefly used to disguise other drugs in administering them to children. Mr. Loudon, after treating of the ash manna, points out the distinction between it and the manna of Scripture, as also the manna produced from the sap of the larch, the rhododendron, the walnut, and the beech.

The *Mountain-Ash*, familiarly known as the *Witchen-tree* and the *Fowler's Service-Tree*, is very different from the foregoing. It is found in most of the hilly countries of Europe and Asia, and attains a height of about twenty feet. The wood which it yields is fine-grained, hard, capable of receiving a permanent stain and a high polish; and it is applied, when of sufficient dimensions, to most of the purposes for which pear-tree wood is used. The shoots are well adapted for poles and for making hoops, and the bark is in demand by tanners.

The fruit of the mountain-ash is greedily devoured by birds; and in Germany the fowlers bait springes, or nooses of hair, with the berries of this tree, which they bury in the woods to entice the redwings and fieldfares. Hence one of the names of the tree. Evelyn, while speaking of the berries, says "they form a tempting bait for the thrushes; as long as they last in your woods, you will be sure of their company." In various parts of the north of Europe the berries are dried and ground into flour, and used in times of scarcity as a substitute for wheaten flour. They are sometimes eaten raw as a fruit; and Mr. Selby says that he has seen them exposed for sale for this purpose in the streets of Glasgow. A spirit is distilled from them in Livonia, Sweden, and Kamtschatka; and in Evelyn's time a kind of beer or ale was brewed from them in Wales. They are also said to yield, when infused in water, a kind of acid drink somewhat resembling perry.

One of the most singular circumstances connected with the mountain-ash is the superstition with which it is often regarded, and which has given rise to some odd "uses" of the tree. The "Witchen-tree," one of its synonyms, alludes significantly to this superstition; while the words Rowan, Rowne, Roan, &c., variously spelled, will serve to refer to many passages in old writers where allusion is made to the supposed power of this tree in driving away witches.* Lightfoot speaks of the existence of this superstition in Scotland; Johnson, in Northumberland; Sir Thomas D. Lauder, in Wales; and Bishop Heber, in India: and in all of these countries and places the popular weakness is similar in character. Mr. Waterton, the South American traveller, communicated to the 'Magazine of Natural History,' a few years ago, an account of an instance of this kind, which came under his notice at his estate at Walton in Yorkshire. "In the village of Walton," he remarks, "I have two small tenants; the name of the one is James Simpson, and that of the other Sally Holloway; and Sally's house stands a little before the house of Simpson. Some three months ago I overtook Simpson in the turnpike road, and I asked him if his cow was getting better, for his son had told me that she had fallen sick. 'She's coming on surprisingly, Sir,' quoth he; 'the last time the cow-doctor came to see her, "Jem," said he to me, looking earnestly at old Sally's house—"Jem," said he, "mind and keep your cowhouse door shut before the sun goes down, otherwise I woant answer for what may happen to the cow." "Ay, ay, my lord," said I, "I understand your meaning; but I am up to the old slut, and I defy her to do me any harm now."' 'And what has old Sally been doing to you, James?' said I. 'Why Sir,' replied he, 'we all know too well what she can do. She has long owed me a grudge; and my cow, which was in very good health, fell sick immediately after Sally had been seen to look in at the door of the cowhouse, just as night was coming on. The cow grew worse; and so I went and cut a bit of *wiggin* (another name for the mountain-ash), and I nailed the branches all up and down the cowhouse; and, Sir, you may see them there, if you will take the trouble to step in. I am a match for old Sally now, and she can't do me any more harm, so long as the wiggin branches hang in the place where I have nailed them. My poor cow will get better in spite of her.'"

* It has been supposed by some commentators, that the word "*aroint*," which occurs twice in Shakspere ('Macbeth' and 'King Lear'), has allusion to this reputed power of the Mountain-Ash or Rowan-tree, used in the sense of a threat—"A rowan-tree to thee, Witch!" But among the notes to the 3rd Act of 'King Lear,' in Mr. Knight's 'Pictorial Shakspere,' is the following:—"It is conjectured that it (the word *aroint*) is a compound of *ar*, or *aer*, and *hynt*: the first a very ancient word, common to the Greek and Gothic languages in the sense of *to go*; the second derived from the Gothic, and still in common use under the same form and with the same meaning, *hind*, *behind*, &c. in English, and *hint*, or *hynt*, in German." This view of the case is supported by many illustrations.

Fire-Flies of Jamaica.—The fire-flies of Jamaica emit so brilliant a light, that a dozen of them, enclosed within an inverted glass tumbler, will enable a person to read or write in the night-time without the least difficulty. Indeed, it is an expedient to which many resort. These flies are in size as large as a common hive bee, and perfectly innocuous. Their appearance in unusual numbers acts as a thermometer to the natives; and it is an unquestionable indication of approaching rain. To travellers they afford, even on the darkest nights, sufficient light to guide their footsteps with the greatest safety. The light which they send forth is in every respect equal to that of the purest diamond: and hence the Creole coquettes frequently insert a few of them, confined in pods of gauze, in their hair and other parts of their dress, in the same manner as actresses avail themselves of the paste-jeweller's art.—*Phillippo's Jamaica.*

Use of Oxen in Australia.—Some time will be necessary to become reconciled to the use of bullocks in the multifarious capacities to which the practice of the colony devotes them, and whose assistance as animals of draught will be new to the experience of English and Scotch tillers of the soil. From the tardiness of their movements, combined with the small amount of work performed, they impart a double portion of tedium to the labours of the husbandman, and certainly appear to great disadvantage in contrast with the superior activity of horses; but this slowness, although sufficiently annoying, is more than compensated by the superior steadiness of their draught; and but for the weight of their numbers acting in concert, it is doubtful whether any other power could enable the colonist to overcome the resistance offered to the plough in breaking up the virgin soil; at all events, it would be impossible by any other means to convey a load along the rugged tracts that serve as the only lines of communication, abounding as these do with the unremoved impediments of the wilderness—deep gullies, treacherous swamps, precipitous ascents, and bridgeless rivers. It is in meeting these obstacles that their utility becomes most obvious. However deep the dray may be embedded in mud, or perilous the acclivity up the face of which it is toiling, the driver has no fear for the result. Inch by inch it is dragged forward, the chain so stiff as to resemble a bar of polished steel, while the team never for a moment relaxes from a uniform strain that fails not, though by slow degrees, to force a way against all opposition. In such situations the strength of horses would be speedily exhausted by their own struggles, which, so far from being useful, would tend rather to endanger themselves and the vehicle.—*A Summer at Port Phillip, by the Hon. R. D. Murray.*



[Hatfield.]

PROGRESSES OF QUEEN ELIZABETH.—XIII.

[Concluded from p. 418.]

Subsequent to 1592 the Progresses of Queen Elizabeth are few and unimportant. In 1595 she visited Sir John Puckering at Kew, who had recently received from her a grant of land worth 100*l.* per annum in fee-farm. On alighting she was presented with a fan. Between the garden-gate and the house a messenger met her with "a well-penned speech," and presented her with a bouquet which contained in it a jewel with pendants of diamonds valued at 400*l.* at least. After dinner there was another gift of a pair of virginals; and in her bedchamber another of a fine gown and a juppin, which so pleased her highness, that, to grace him more, "she of herself took from him a salt, a spoon, and a fork of fair agate." (A profitable way of expressing her satisfaction.) In the same year she was entertained by the Earl of Essex, at his house in the Strand; and there were many entertainments at her places of residence—Hampton, Richmond, Westminster, and Greenwich. Hentzner, whom we have already quoted, thus describes her appearance, as he saw her at Greenwich in 1598:—"Next came the Queen, in the sixty-fifth year of her age, as we were told, very majestic; her face oblong, fair, but wrinkled; her eyes small, yet black and pleasant; her nose a little hooked, her lips narrow, and her teeth black (a defect the English seem subject to from their too great use of sugar); she had in her ears two pearls, with very rich drops; she wore false hair, and that red; upon her head she had a small crown. . . Her bosom was uncovered, as all the English ladies have it till they marry; and she had on a necklace of exceeding fine jewels; her hands were small, her fingers long, and her stature neither tall nor low; her air was stately, her manner of speaking mild and obliging. . . As she went along (he is describing her as he saw her and her court going to prayers) in all this state and magnificence, she spoke very graciously, first to one, then to another, whether foreign ministers, or those who attended for different reasons, in English, French, and Italian; for, besides being well skilled in Greek, Latin, and the languages I have mentioned, she is mistress of Spanish, Scotch, and Dutch: whoever speaks to her, it is kneeling; now and then she raises some with her hand."

In August, 1598, a very short time before the death of its owner, the sagacious, prudent, politic, though perhaps too unscrupulous Cecil, Lord Burleigh, the deservedly esteemed and no doubt sincerely regretted minister of the Queen, her majesty was at Theobalds, but we have no particulars of the visit. In September she went to Nonsuch, "taking Dr. Cæsar in her way." This gentleman, who became in the reign of her successor Sir Julius Cæsar, and Master of the Rolls, has left a record of this event. He states that "the Queen visited him at his house at Mitcham, and supped, and lodged and dined there the next day; and that he presented her with a gown of cloth of silver richly embroidered, a black worked mantle with pure gold, a taffeta hat, white, with several flowers, and a jewel of gold set therein with silver and diamonds. Her Majesty removed from my house after dinner, the 13th of September, to Nonsuch, with exceeding good contentment; which entertainment of her majesty, with the charges of five former disappointments, amounted to 700*l.* sterling, beside mine own provisions, and whatever was sent unto me by my friends." This seems an extraordinarily large expenditure for little more than one day's visit, even including the "five former disappointments," and the presents made her on this occasion, but is still sufficient to show how costly must have been her Majesty's pre-

sence to those whom she distinguished with such a mark of her favour, and also that, notwithstanding the expense, her visits were rather courted than avoided. Sir William More, of Loseley, seems to have been an exception in endeavouring to escape these dearly-purchased marks of her favour. Was it that the Queen, knowing the economical feelings of the knight, took a facetious revenge by visiting him more frequently than almost any other?

In July, 1599, her Majesty, on her way to Nonsuch, visited the manor-house of Foxchall (Vauxhall), the Dutch ambassador, Sir Noel Caron, at South Lambeth, and Lord Burleigh, at Wimbledon. In August she visited Sir Francis Carew, at Beddington in Surrey, for three days, where the Queen's Oak and her Walk are still pointed out. Sir Francis was a distinguished horticulturist, and during the visit he "led her Majesty to a cherry-tree, whose fruit he had of purpose kept back from ripening, at the least one month after all cherries had taken their farewell of England. This secret he performed by so raising a tent or cover of canvas over the whole tree, and wetting the same now and then with a scoop or horn, as the heat of the weather required; and so by withholding the sunbeams from reflecting upon the berries, they grew both great, and were very long before they had gotten their perfect cherry colour; and when he was assured of her Majesty's coming, he removed the tent, and a few sunny days brought them to their full maturity." She returned thence to Nonsuch, then removed to Richmond, which she left on November 15, for Westminster, where she was received by torch-light by the mayor, aldermen, and sheriffs of London, with a great train on horseback, in velvet coats and chains of gold, "as of late times had been used for honour of the Queen."

A progress into North Wiltshire was contemplated in 1600, but though the letters and diaries of her courtiers say "her Majesty is in very good health, and goes abroad every day to ride and church," it is tolerably clear that she did not feel her strength equal to more than journeys of much less extent. She resided chiefly at Nonsuch during the summer, visiting George Evelyn at Norbiton, near Kingston; Lady Edmonds at Oatlands, where she slept a night; the archbishop of Canterbury at Croydon, and a few others. On one of her returns to Nonsuch, it is remarked that "she had just cause to be offended that at her remove to this place she was so poorly attended, for I never saw so small a train." Later in the autumn her health appears more re-established, for there is less said of it, while her exercises appear to be more active. On August 26th she was at Oatlands, the court being now given to 'hunting and sports,' and 'it is thought she will remain at Oatlands till foul weather drives her away.' In September she visited Hanworth, where she had lived in her youth with the lord admiral Seymour, one of the articles of impeachment against whom was the having attempted to gain her affections. Whether founded in fact or not, this revisiting of scenes so connected with her earlier life must have excited various thoughts, and probably chiefly mournful, as she looked back on them now through the long vista of busy years which had passed since she left them. She dined here, and hunted. On the 13th of November, five hundred citizens on horseback, "every of them having two staff torches to attend on them," with the lord mayor and aldermen, welcomed her back to Westminster.

In this year (1600) a commission was issued to the lord high treasurer, the lord chamberlain, the chancellor of the Exchequer, and the treasurer of her Highness's chamber, to examine and take a perfect survey of all "robes, garments, and jewels, as well within the court as at the Tower and Whitehall." The account is a long one, but in the result it appears that the wardrobe, exclusive of her coronation, mourning, parliamentary robes, and those of the order of the Garter, consisted of 99 robes, 102 French gowns, 67 round gowns, 100 loose gowns, 126 kirtells, 136 foreparts, 125 petticoats, 96 cloaks, 31 cloaks and safeguards, 13 safeguards, 43 safeguards and jupes, 85 doublets, 18 lap-mantles, 27 fans, and 9 pantofles. From the richness of the materials and the value of the ornaments which were permanently attached to the different dresses, the queen's wardrobe at this time contained a treasure not unworthy the attention of even a chancellor of England's exchequer, however incongruous it might appear now with our present ideas of the duties of his office.

In August, 1601, the queen was at Windsor, a place in which she took much delight. In September she began her progress, which was through Sussex and Hampshire, being received on Chichester Heath by the sheriff and the gentlemen of the county. On September 10 she was at Basing, the seat of the Marquis of Winchester, and here she entertained the Duc de Biron, the ambassador of France, who was accompanied by twenty of the nobility of France and about four hundred attendants. She returned by Farnham to Windsor, whence she proceeded to Reading, dining on one day at the residence of Sir William Knollys, her comptroller, at Causham or Caversham, in Oxfordshire. She also visited Sir Edward Norris at Englefield, and Sir Humphrey Foster at Pidworth, and also in the course of the year, Sir Edward Coke at Stoke Pogeis. Though there was again talk of her visiting Wiltshire, this was all the progress of the year, and on the 20th of October she was received by the citizens on her return from Richmond to Westminster.

On May-day in 1602 the Queen went "a maying to Sir Richard Buckley's at Lewisham." In July she went from Greenwich to visit Sir William Russell at Chiswick, then to Harlington, to Ambrose Copinger's, thence to the lord keeper Egerton's at Harefield, and lastly to Sir William Clarke's at Burnham.

Of the visit to Harefield we cannot do better than copy the account given by the editor of the 'Pictorial Shakspere:'—

"The Queen came to Harefield on the 31st of July, and remained there during the 1st and 2nd of August. In those days Harefield Place was 'a fair house standing on the edge of the hill, the river Coln passing near the same through the pleasant meadows and sweet pastures, yielding both delight and profit.' This is Norden's description a little before the period of Elizabeth's visit. The Queen was received, after the usual quaint fashion of such entertainments, with a silly dialogue between a sheriff and a dairymaid as she entered the domain, and the house welcomed her with an equally silly colloquy between Place and Time. The Queen must have been somewhat better pleased when a copy of verses was delivered to her in the morning, beginning

'Beauty's rose, and virtue's book,
Angel's mind, and angel's look.'

The weather, we learn from the same verses, was unpropitious:—

'Only poor St. Swithin now
Doth hear you blame his cloudy brow.'

Some great poet was certainly at work on this occasion, but not Shakspere. It was enough for them to present the sad story of

'The gentle lady married to the Moor.'

Another was to come within some thirty years, who

should sing of Harefield with the power of rare fancy working upon classical models, and, who thus makes the genius of the wood address a noble audience in that sylvan scene:—

> 'Yet know, by lot from Jove, I am the power
> Of this fair wood, and like in oaken bower
> To nurse the sapling tall, and curl the grove
> With ringlets quaint, and wanton windings weave;
> And all my plants I save from nightly ill
> Of noisome winds and blasting vapours chill;
> And from the boughs brush off the evil dew,
> And heal the harms of thwarting thunder blue;
> Or what the cross dire-looking planet smites,
> Or hurtful worm with canker'd venom bites.
> When evening gray doth rise, I fetch my round
> Over the mount and all this hallowed ground;
> And early, ere the odorous breath of morn
> Awake the slumbering leaves, or tassel'd horn
> Shakes the highth thicket, haste I all about,
> Number my ranks, and visit every sprout
> With puissant words, and murmurs made to bless.'

Doubly honoured Harefield! Though the mansion has perished, yet are thy groves still beautiful. Still thy summit looks out upon a fertile valley, where the gentle river wanders in silent beauty. But thy woods and lawns have a charm which are wholly their own. Here the 'Othello' of William Shakspere was acted by his own company; here is the scene of the Arcades of John Milton."

From Burnham, where she visited Sir William Clarke, who appears to have given little satisfaction, the Queen returned to Oatlands, thence to Richmond, and then to London. On January 21, 1602-3, "in very foul and wet weather," she removed to Richmond, where, on the 24th of March, she died, in the forty-fifth year of her reign and the seventieth of her age.

Notwithstanding the many little vanities that may have been discerned in the course of our account of her Progresses, no doubt can be entertained of the extraordinary abilities of the Queen. Called to the throne at a period of great difficulty both at home and abroad, and beset with all kinds of seduction arising from her love of admiration and her womanly feelings, she steered her onward course with a strict devotion to what she considered the welfare of her people and the country at large. Her ministers were chosen for their ability, and, while her favourites were frequently in disgrace and occasionally changed, she continued steadfast to them, supporting them against all opposition, and affording them her entire confidence in spite of all sinister influence. Though occasionally guilty of what would now be considered despotic acts, England is greatly indebted to her government for its present position. Under her steady and firm control, the constitution gradually fixed itself into its present form, while her prudent expenditure and the encouragement she gave to commerce and manufactures allowed the industry and resources of the country to expand in a direction that has enabled them to reach their present commanding magnitude. And her Progresses, by encouraging her gentry to keep up large establishments in the country, instead of inducing them to live entirely at court, must have had considerable effect in continuing a class of which England may yet be justly proud, and which no other nation possesses—the country gentlemen; while her presence, and the amenity which she always displayed towards the poorer classes, must have produced the best effects on the intercourse and the feelings between them and their immediate superiors. By these Progresses also she was better enabled to judge of the real situation of her people; and there is little doubt that many important measures of her reign were the results of observations made during her journeys. "Good Queen Bess," and "the golden days of Queen Bess," though perhaps occasionally too highly extolled for the reality, when used in contrast to more recent times, have owed much of their vitality to the kindly feelings developed and the pleasures enjoyed in consequence of these frequent Progresses.

THE TYROL.

[Concluded from page 470.]

In Tyrol, owing to the great unevenness of the surface, the air is in continual motion, and a calm day is a rare occurrence. The southern winds are like the sirocco of Italy, much feared on account of the effect that they produce on the health, especially in the southern valleys. They are most frequent towards the end of summer and in the beginning of autumn, and dissolve in a few hours an immense quantity of snow, which about that season begins to cover the less elevated mountains, and the volume of water which is thus conveyed to the rivers produces extensive inundations in some parts of the valleys. The most fertile lands are in the valleys of the Inn and of the Etsch; the valley of the Etsch is the most fruitful.

Wheat, rye, barley, and oats are cultivated where the climate or stony soil is not unfavourable. In some parts buckwheat is grown to a great extent, and used for bread. Millet is also grown, but not extensively. Indian corn is the principal object of agriculture in the valleys on the border of Italy, and potatoes are nearly as much cultivated as in the northern. Hops grow wild in the southern districts, but they are little cultivated. Tobacco is grown to some extent in the southern valleys. Flax and hemp are cultivated everywhere, but not extensively. Fruit-trees abound in the southern valleys, and large quantities of fruits are exported to Bavaria. Near Trent are plantations of fig-trees, and at Roveredo chestnuts are very common. In these parts are also plantations of olive-trees and mulberry-trees. A considerable quantity of silk is annually collected. On the banks of the Lago di Guarda are plantations of oranges, whose fruits get quite ripe. Wine is made in large quantities, and some sorts are very good, but they do not keep.

Cattle are of middling size and rather numerous; horses are less abundant, and better for the draught than for the saddle. Sheep are very numerous, and in later times some attention has been paid to the improvement of the breed. Goats are more common than in any other part of Austria, but pigs are not much kept. Fowls, geese, and ducks are not plentiful. There are chamois, hares, marmots, and partridges; and there are some large birds of prey, especially eagles.

Gold is found in small quantities; silver is somewhat more abundant. Copper also occurs; lead is more abundant: iron also abounds, but it is less worked than would be the case if the mines in Illyria were not much richer. Calamine is found and worked at a few places: coal also is worked to some extent. In the southern districts there is a valuable kind of marble, resembling that of Carrara, which is much worked.

Amid these beauties of nature, the most wonderful work of art is the military road over the Stelvio (a part of the Ortler Spitz), the highest road in Europe, the summit being nine thousand one hundred feet above the level of the Mediterranean, two thousand three hundred feet higher than that of the Simplon, and one thousand feet higher than that of Mount St. Bernard; the crest of the Pass of the Simplon being estimated at about six thousand seven hundred feet, that of the Stelvio at about nine thousand. Murray's 'Handbook of Southern Germany' thus describes it:—

"It was constructed by the Austrian government, in order to open an additional line of communication between Vienna and the centre of Lombardy, and was completed in 1824. It was planned by the chief engineer Donegani, and executed, under the inspection of the engineer Domenici, by the contractor Zalachini. Whether we consider the boldness of the design, the difficulties of its execution from the great height and exposure to storms and avalanches, or the grandeur of the scenery through which it passes, the route of the Stelvio is the most remarkable in Europe. The galleries cut for miles through the solid rock, along the margins of the Lake of Como, those higher up built of massive masonry strong enough to resist the fall of avalanches—the long causeways carried over morasses—the bridges thrown across torrents—the long succession of zigzag terraces, carried up with so gradual a slope that an English mail-coach might trot up on one side, and scarce require to lock a wheel on the other, which nevertheless scale and surmount one of the highest ridges in the Alps—these are works which, without exaggeration, deserve to be called stupendous. But the works and agencies of nature, with which they come in contact, reduce them to comparative insignificance. This road, upon which so much labour and treasure have been expended, is seldom passable for more than four months in the year—from June to October. Every spring, when the snow disappears, the ravages of the winter's storm and avalanches are disclosed to view: wooden galleries broken through, large tracts of the road swept away, others overwhelmed with rubbish and fragments of rock: injuries annually occurring; to be repaired only at a vast expense (11,000 florins a year), and after the lapse of a considerable time." In more recent accounts it is said to be now abandoned, as it was found impossible to keep it safe and in repair.

The religion of the Tyrolians is Catholic, and the people are remarkably devout, and are accustomed to keep all the feasts of the church as holidays. Rifle-shooting and dancing form their principal amusements. "No fête-day," says Murray's 'Handbook,' "holiday, or marriage passes off without a rustic ball; such entertainments afford the traveller insight into the manners and customs of the people, and an opportunity of observing the varieties of costume, &c. Those, however, who have formed their notions of a Tyrolese dance from a ballet at the Opera, will be much disappointed. They will find the dancers assembled in the close low room of an inn, so thronged that it would appear impossible to move, much less dance, among the throng; yet no sooner does the music strike up, than the whole is in a whirl; no jostling and confusion occur, and the time of the waltz is kept with most unerring precision. Instead of the elegant costume of the theatre, with its short petticoats and flying ribands, they will find the lasses decked out in pointed hats, or round fur or woollen caps, or in handkerchiefs tied under their chins, and with waists reaching up nearly to their necks. The men often wear Hessian boots, which they strike together with great clatter by way of beating time, every now and then uttering a shrill cry, and leaping round in the air exactly in the manner of the Highland fling. The enthusiasm, almost approaching to frenzy, with which the dance is kept up, in spite of the heat and crowd, from noon till night, is truly surprising. The partners often seize each other by the shoulders, in an attitude not unlike hugging; they do not always follow the same monotonous revolution, but at one time the man steps round his partner; at another, lifting her arm high in the air, he twirls her round on her heel with a rapidity that makes her appear to spin, and then, quickly re-uniting, they resume their circular evolutions with an agility and perseverance truly marvellous."

The town of Hall, of which a view is given at the head, is the principal place in the country for the manufacture of salt. It is situated about five miles below Innsbruck, on the north side of the Inn, which is navigable up to it for barges, and at the foot of Mount Sollstein, and contains about 4800 inhabitants. "Its appearance," says Barrow, in his 'Tour to Austrian Lombardy and the Northern Tyrol,' "is that of a cluster of dark and gloomy buildings, blackened with smoke and soot, partly from coal, but chiefly from wood, used in the salt-boiling houses; the pitch-pine is probably that most in use, though all the fir tribe give out smoke enough. Large piles of this or other kinds of wood were heaped up for boiling the brine, which is sent down in tubes or troughs from the mine in the mountains behind Hall, a distance of five or six miles, and accessible only by a steep and rugged road." Inglis, in his 'Tyrol,' says:—"From Ambras I descended the hill, and gained the road to Hall, passing through fine meadows and fields of Indian corn, and through several villages charmingly situated in little amphitheatres at the foot of the mountains; and after an hour and a half's walk, I reached the ancient and smoky Hall, than which there is no town more smoky and dark either in Staffordshire or Lancashire. In the interior, as well as outside, Hall bears upon its front the appearance of great antiquity. Gloomy old houses flank narrow winding streets; scarcely one modern building is to be seen: the ancient wall, dark towers, and little gates, yet remain, as well as the deep ditch, and recall to mind the wars of early times, of which Hall was so often the scene. One of the gates bears an inscription in which the year 1351 is distinctly visible." It has, however, some good old churches, in one of which is buried the brave Spechbacher, the companion of Hofer in the war against the French and Bavarians, and to whose memory there is a monument, bearing an urn unattached to the outer wall.

The manufacture of salt and the economy of the adjacent mine are curious, but as they closely resemble those of Salzburg, of which we have given an account in No. 194, we shall not need here to repeat the description.

Water-holes of Port Phillip.—However deserted by its current, it is rare to find the channel of one of these streams without some portion of its contents remaining in those deep pools of water that occur at greater or less intervals in its course, and in colonial phrase are termed 'water-holes.' That these water-holes form one of the most extraordinary features of this new world must, I think, be the impression of every stranger. Often in taking my course along the grassy bed of what in winter is a running stream of no great depth, I have come upon a natural basin of water, deep and clear, and in a situation where no winding or abrupt declivity might show it to be the effect of an eddy in the current. This is a water-hole; and many of them attain the size of ponds, the contents of which seldom become stagnant, while the depth ranges from ten to twenty feet, and diminishes but little during the summer. Not a few are so regularly shaped as to appear the work of art; their margin forming a complete circle, at the brim of which you find the water as deep as in the centre. To what they owe their origin it is difficult to conjecture: it is probable their formation may be traced to the unseen springs by which they are fed, whose feeble efforts during the course of ages may have scooped out cavities such as these from the soil around them. But however mysteriously excavated and supplied, we cannot fail to arrive at the conclusion that they constitute a wonderful provision for retaining an element, the want of which would render large tracts of great fruitfulness, and now abounding in flocks and herds, as devoid of life as a desert.—*A Summer at Port Phillip, by the Hon. R. D. Murray.*



and Copies from his Paintings.

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XVIII.

THE BELLINI: A.D. 1421 to A.D. 1516.

JACOPO BELLINI, the father, had studied painting under Gentile da Fabriano, of whom we have spoken as the scholar, or at least the imitator, of the famous monk Angelico da Fiesole. To express his gratitude and veneration for his instructor, Jacopo gave the name of Gentile to his eldest son: the second and most famous of the two was christened Giovanni (John); in the Venetian dialect *Gian Bellini.*

The sister of the Bellini being married to Andrea Mantegna, who exercised for forty years a sort of patriarchal authority over all the painters of northern Italy, it is singular that he should have had so little influence over his Venetian relatives. It is true the elder brother, Gentile, had always a certain leaning to Mantegna's school, and was fond of studying from a mutilated antique Venus which he kept in his studio. But the genius of his brother Gian Bellini was formed altogether by other influences. The commercial intercourse between Venice and Germany brought several pictures and painters of Germany and the Netherlands into Venice. In the island of Murano, at Venice, dwelt a family called the Vivarini, who had carried on the art of painting from generation to generation, and who had associated with them some of the early Flemings: thus it was that the painters of the first Venetian school became familiarised with a style of colouring more rich and vivid than was practised in any other part of Italy: they were among the first who substituted oil painting for distemper. To these advantages the elder Bellini added the knowledge of drawing and perspective taught in the Paduan school, and the religious and spiritual feeling which they derived from the example and instruction of Gentile da Fabriano. In these combined elements Gian Bellini was educated, and founded the Venetian school, afterwards so famous and so prolific in great artists.

The two brothers were first employed together in an immense work, which may be compared in its importance and its object to the contemplated duration of our houses of parliament. They were commanded to paint the Hall of Council in the palace of the Doge with a series of pictures representing the principal events (partly legendary and fictitious, partly authentic) of the Venetian wars with Frederic Barbarossa (1177); the combats and victories on the Adriatic; the reconciliation of the Emperor with Pope Alexander III. in the Place of St. Mark, when Frederic held the stirrup of the pope's mule; the Doge Ziani receiving from the

pope the gold ring with which he espoused the Adriatic in token of perpetual dominion over it; and other memorable scenes dear to the pride and patriotism of the Venetians.

These were painted in fourteen compartments round the hall. What remains to us of the works of the two brothers renders it a subject of lasting regret that these frescoes, and others still more valuable, were destroyed by fire in 1577.

In 1452 Constantinople was taken by the Turks, an event which threw the whole of Christendom into consternation, not unmixed with shame.* The Venetians were the first to resume their commercial relations with the Levant; they sent an embassy to the Turkish sultan to treat for the redemption of the Christian prisoners and negotiate a peace. This was happily concluded in 1454, under the auspices of the Doge, old Francesco Foscari.* It was on this occasion that the Sultan Mohammed II., having seen some Venetian pictures, desired that the Venetian government would send him one of their painters. The Council of Ten, after some deliberation, selected for this service Gentile Bellini, who took his departure accordingly in one of the state galleys, and on arriving at Constantinople was received with great honour. During his residence there he painted the portrait of the Sultan and one of his favourite sultanas; and he took an opportunity of presenting to the Sultan, as a token of homage from himself, a picture of the head of John the Baptist after decapitation. The Sultan admired it much, but criticised, with the air of a connoisseur, the appearance of the neck: he observed that the shrinking of the severed nerves was not properly expressed. As Gentile Bellini did not appear to feel the full force of this criticism, the Sultan called in one of his slaves, commanded the wretch to kneel down, and, drawing his sabre, cut off his head with a stroke, and thus gave the astonished and terrified painter a practical lesson in anatomy. It may be easily believed that after this horrible scene Gentile became uneasy till he had obtained leave of departure, and the Sultan at length dismissed him, with a letter of strong recommendation to his own government, a chain of gold, and other rich presents. After his return to Venice he painted some remarkable pictures, among them one representing St. Mark preaching at Alexandria, in which he has painted the men and women of Alexandria in rich Turkish costumes, such as he had seen at Constantinople. This curious picture is now in the Academy at Milan, and is engraved in Rosini's 'Storia della Pittura.' A portrait of Mohammed II., painted by Gentile Bellini, is said to be in England. All the early engravings of the grim Turkish conqueror which now exist are from the portraits painted by Bellini. He died in 1501, at the age of eighty.

* The story of the two Foscari is the subject of a tragedy by Lord Byron. The taking of Constantinople is the subject of one of the most beautiful tragedies of Joanna Baillie.

A much more memorable artist in all respects was his brother Gian Bellini. His works are divided into two classes—those which he painted before he adopted the process of oil-painting, and those executed afterwards. The first have great sweetness and elegance and purity of expression, with, however, a certain timidity and dryness of manner; in the latter we have a foretaste of the rich Venetian colouring, without any diminution of the grave simple dignity and melancholy sweetness of expression which distinguished his earlier works. Between his sixty-fifth and his eightieth year he painted those pictures which are considered as his chefs-d'œuvre, and which are now preserved in the churches at Venice and in the Gallery of the Academy of Arts in that city.

It has been said that Gian Bellini introduced himself disguised into the room of Antonello da Messina when he was painting at Venice, and stole from him the newly-discovered secret of mixing the colours with oils instead of water. It is a consolation to think that this story does not rest on any evidence worthy of credit. Antonello made no mystery of his art, he taught it publicly; and the character of Bellini renders it unlikely that he would have been guilty of such a perfidious trick.

Gian Bellini is said to have introduced at Venice the fashion of portrait-painting: before his time the likenesses of living persons had been frequently painted, but they were almost always introduced into pictures of large subjects: portraits properly so called were



[Gentile Bellini.]

scarcely known till his time; then, and afterwards, every noble Venetian sat for his picture, generally the head only or half-length. Their houses were filled with family portraits, and it became a custom to have the effigies of their doges and those who distinguished themselves in the service of their country painted by order of the state and hung in the ducal palace, where many of them are still to be seen. Up to the latest period of his life Gian Bellini had been employed in painting for his countrymen only religious pictures or portraits, or subjects of Venetian history; the classical taste which has spread through all the states of Italy had not yet penetrated to Venice: but towards the end of his life, when nearly ninety, he was invited to Ferrara to paint in the palace of the duke a dance of bacchanals. On this occasion he made the acquaintance of Ariosto, who mentions him with honour among the painters of his time.

Gian Bellini died in 1516. He had formed many disciples, and among them two whose glory in these later times has almost eclipsed that of their great teacher and precursor—GIORGIONE and TITIAN. Another, far less famous, but of whom some beautiful pictures still exist at Venice, was Curia da Carneghiano. There is at the palace of Hampton Court a very curious little head of Bellini, certainly genuine, though much injured: it is inscribed underneath, *Johanes Bellini ipse*. In the Louvre at Paris are three pictures ascribed to Gian Bellini: one contains his own portrait and that of his brother Gentile, heads only; the former is dark, the latter fair; both wear a kind of cap or *beret*. Another, about six feet in length, represents the reception of a Venetian ambassador at Constantinople. A third is a Virgin and Child. The first-mentioned is by Gentile, and the two last uncertain. In the Berlin Museum are seven pictures by him, all considered genuine, and all are painted on panel and *in oils*; they belong therefore to his latest and best period.

THE CULTIVATION OF THE SUGAR-CANE IN SPAIN.

IT is perhaps not generally known that Spain possesses a soil and a climate fitted to the production of sugar: and that, if peace and industry could be once again restored to that beautiful but distracted country, this product might possibly become an article of importance in relation to national wealth. In our fourth number, where a wood-cut of the sugar-cane is given, it is briefly stated that "early in the fifteenth century the sugar-cane first appeared in Europe; Sicily took the lead in its cultivation; thence it passed to Spain, Madeira, and the Canary Islands; and shortly after the discovery of the New World by Columbus, this plant was conveyed to Hayti and Brazil, from which latter country it gradually spread through the islands of the West Indies." Since then, however, Dr. Traill has communicated to the 'Edinburgh Philosophical Journal' a paper which was read before the Royal Society of Edinburgh, detailing a number of curious and interesting circumstances connected with the cultivation of the sugar-cane in Spain, derived apparently from authentic sources. The first portion of the paper relates to the early introduction of this branch of agriculture into Europe, especially Spain; and the rest to the progress of the Spanish attempts in modern times.

The cultivation of the sugar-cane is supposed to have originated in India or in China; for the first distinct account of it in classic authors is derived from the discoveries of Nearchus, the officer sent down the Indus by Alexander the Great, to explore the Indian Seas, in the year 325 B.C. According to Strabo, he describes it as a honey prepared from a reed without the aid of bees. From India the sugar-cane was introduced into Arabia, Egypt, and the western parts of Asia; and it is slightly mentioned by several of the early writers, among whom were Varro, Dioscorides, Pliny, Arrian, and Theophrastus. It was spoken of by one as "a sweet fluid expressed from a reed;" by another as "a concrete honey obtained from reeds, having a salt-like consistency, and crushing between the teeth." Pliny spoke of the Indian sugar being superior to the Arabian; and Arrian states that it was an article of commerce in the Erythræan Sea.

Dr. Traill suggests that the appellations by which sugar is known might in itself almost lead to a conjecture of the source whence different countries obtained their knowledge of the plant; for the Sanscrit name *Sarkara*, corrupted in various Indian dialects into *Sakkara*, *Sukar*, and *Sukir*, is evidently the root whence the name of the product of the cane among all European nations is derived,—exemplified in the Latin *saccharum*, the Italian *zucchero*, the Spanish *azucar*, the Russian *sachar*, the German *zucker*, the French *sucre*, and the English *sugar*. In Sumatra, Java, the Malayan peninsula, the Sandwich and Friendly Islands, the Isle of France, and other parts of the East, the names by which sugar is known, though bearing some resemblance one to another, seem to belong to a stock different from those above mentioned; *Taba*, *Tubbu*, *Tebu*, *Tao*, *Too*, *To*, and *Tang*, being some of these varieties. From these circumstances Dr. Traill conjectures that all the Western nations owe their knowledge of the sugar-cane to the peninsula, while the smaller islands of the Pacific, and perhaps also China, received it originally from the Malayan Archipelago.

At what date the introduction of the sugar-cane into Europe should be fixed, seems to be a doubtful point, but it was certainly known in the Morea, Rhodes, Malta, and Sicily before the Crusades. There is evidence that it was cultivated in Egypt, around Assouan, as early as the year 766; that it was first introduced into Sicily between 1060 and 1090, and had become in that island a considerable agricultural object in 1166, when a sugar-mill is mentioned in a charter quoted by Father Lafitau in his 'Histoire des Découvertes et Conquêtes des Portugais."

There is reason to believe that the sugar-cane was introduced into Spain by the Moors soon after their settlement in the peninsula in the year 714. Certain it is that cultivation of sugar was greatly fostered by the Moors of Spain, and most successfully pursued by that active and enterprising race, who long held the foremost place in the prosecution of arts and learning. These sugar-plantations extended over a great part of the eastern shores of Valencia and Granada; and where the soil or climate was less fitted for this species of husbandry, the rearing of silk-worms, the cultivation of the fig, the orange, the lemon, and the olive, with wheat and barley of the finest quality, gave full employment to Moorish agricultural industry. For some time after the final subjugation of the Moors of Spain, large tracts of land in Valencia and Eastern Andalusia were still planted with the sugar-cane. The first severe check it received was from the extension of sugar cultivation in the West Indian Islands, and its second from the barbarous and impolitic expulsion of the Moors from Spain in 1609. The cultivation almost entirely ceased in Valencia, but it sustained itself feebly in Andalusia. In 1814 Dr. Traill found sugar a considerable article of agricultural industry in the eastern parts of Andalusia, notwithstanding the destructive effects of the Peninsular War.

The sugar-district of Andalusia is described as a narrow tract between a chain of rugged mountains and

the Mediterranean, about a hundred and thirty miles in length, with a medium breadth of four or five miles. For several months of the year scarcely any rain except an occasional thunder-shower falls in Andalusia; but the dews are most copious. In severe winters there are sometimes slight nocturnal frosts, which are very injurious to the sugar-canes.

It might have been expected that a branch of agriculture so interesting, and so little known in the rest of Europe, would have arrested the attention of British travellers in Spain; but Dr. Traill remarks on the fact, that it has scarcely been noticed by any of our travellers. In none of the narratives of tours, of Clarke, Townsend, Dillon, Swinburne, Semple, or Inglis, do we find any account of this branch of Spanish husbandry. The paucity of information led Dr. Traill to publish the result of a visit to the Spanish sugar-plantations, aided by references to the memoranda of an extensive planter. In Granada the cultivation has suffered many fluctuations, but about the year 1808 it was in a flourishing state. Sugar-plantations, both large and small, then abounded along the coast from Adra to the southward of Estepona; and mills for crushing the canes, moved either by water-wheels or by mules, were established at many different towns and villages, some of which were destroyed in the subsequent wars, but many remained and were at work at the time of Dr. Traill's visit.

The husbandry is described as follows:—When a plantation is to be formed, the land is duly prepared by digging or ploughing to the depth of eight or ten inches. Paths are left for convenient access to the canes. The soil is enriched by compost manures; and the field is divided by parallel trenches, about twelve inches asunder and eight deep. The earth turned out is laid on the intervals between the trenches. The trenches being finished, the planter proceeds to place horizontally in their bottoms the shoots or tops of the canes of the former season, which have been carefully preserved for this purpose. These shoots are of such length as to have four or five buds in each, generally about nine inches; a portion of the earth is then thrown on the shoots, and as the buds rise above the ground, more soil is gradually added from the heaps, until five months have elapsed, when the whole earth of the heaps has been accumulated around the young plants. During this period of their growth they are carefully weeded, and irrigated if necessary. This irrigation is effected either by bringing water from the mountain-streams in earthenware tubes or raising water by means of a Persian wheel. When the young canes are about fifteen inches high, they are hoed up to six or seven inches; and hoeing and weeding are continued during the growth of the plant. The cane comes to maturity in two years; so that a plantation ought to have one half of its produce ready for cutting annually. The cutting begins in November, and is a season of hilarity and mirth, like that of the vintage in every part of Europe.

The ripe canes, when cut, are carried to the mill, where they are crushed between three cylinders of wood plated with iron, turning on vertical axles. The power is applied to the middle cylinder, on which is fixed a trundle-wheel or pinion applied to spur-wheels on two other cylinders.

The expressed juice of the cane is conveyed from the mill in wooden gutters lined with lead or copper to the boiling-house. The best establishments have a series of three boilers, in which the juice undergoes purification, and hence are called 'clarifiers.' These are of different sizes, placed in brick-work, and each is heated by a separate fire. In the first copper, a preparation of lime is added to absorb the acid always existing in cane-juice; the heat is raised nearly to the point of ebullition, and then the fire is cut off by a damper. A thick scum has then collected on the surface, which is allowed to accumulate for an hour, when the subjacent clear liquid is drawn off by a tap in the lower part of the clarifier. The liquid is next conveyed to the second boiler, where it is subjected to a boiling heat, to inspissate the juice; lime-water being added, and the scum removed. The clarified juice is usually subjected to a similar process in a third clarifier, whence it passes into the principal boiler or *teache*. Here it undergoes its final evaporation; and when judged to be sufficiently concentrated for crystallization, the syrup is laded off into wooden coolers of about ten inches deep, with a surface of twenty or thirty square feet. Here it granulates; and the imperfect crystals thus obtained are removed to the curing-room and drained, as in the West Indian method.

There was an establishment at Marbella, owned by Messrs. Grevigny and Kirkpatrick, which during the Peninsular War was carried on very extensively. One of the partners furnished Dr. Traill with an account of the operations in relation to the year 1806, before Napoleon's Milan and Berlin 'decrees' had interfered with the natural course of commerce. "The Marbella establishment, on the scale it is now carried on, yields in every current year free of frost, after the tithes are paid, four thousand six hundred loaves of refined sugar; which, sold at the usual peace prices, and allowing for the value of the molasses, will bring at least ten hard dollars per loaf, or forty-six thousand *duros*. (To produce this quantity it is necessary to have one hundred and twenty *fanegadas* of good rich land under canes. Eight *fanegadas* are rather less than five English acres. A *duro* is a silver dollar.) Only one half, however, of this land can be cut annually, so that the produce above stated is obtained from sixty *fanegadas*. But, to be so productive, the land must be fully manured, the canes must be well cleaned and hoed, and the irrigation carefully performed; under these circumstances, sixty *fanegadas* will readily afford that quantity of sugar and molasses, and even more. The first planting of the canes is, however, very expensive, amounting to two hundred duros per fanegada. But if this operation be judiciously conducted, the annual cost of maintaining the plantation, of hoeing and weeding the canes, of replanting the perished roots after every cutting, and again manuring the land (which must be done after every crop), will not exceed seventy-five duros per fanegada."

For carrying on the operations of this establishment fifty servants and overseers were required independent of the day-labourers. There were also required eighty oxen, forty mules, and twenty asses; and there was attached to the establishment a farm where all the vegetable food for the whole was raised, consisting of six hundred quintals of wheat (a quintal being equal to one hundred and two pounds three-quarters avoirdupois), one thousand four hundred quintals of barley, three hundred quintals of beans or other pulse, and five thousand quintals of chopped straw. The whole establishment collectively yielded a revenue on the capital invested, varying from seven to twenty per cent. according to circumstances.

It is some years ago that Dr. Traill paid the visit to Spain which enabled him to collect these details, although the account was only published a year or two back; and it would be satisfactory to think that the revolutions and counter-revolutions of the intervening period have left this source of national wealth untouched. But on this point tourists afford very slender information.



[*a*, Nest of the Fuliginous Ant; *b*, Formica fuliginosa; *c*, Yellow Ant (Formica flava); *d*, Fallow Ant (Formica rufa); *e*, Nest of the Common Yellow Ant—built over the margin of a streamlet—observed by S. S.; *f*, Formica emarginata; *g*, Formica ligniperda.]

CURIOSITIES OF BRITISH NATURAL HISTORY.

Ants.

It was said by one of old, "Go to the ant,—consider her ways;" and truly there is much in the economy of these insects to astonish and please. In many respects ants resemble bees and wasps in their habits, living in societies composed of thousands of individuals, establishing colonies, and conducting the various operations necessary to the well-being of the settlement with diligence and order. The interior of an ants'-nest is a busy scene—all is animation; and when rudely opened, the anxiety manifested with respect to the safety of the larvæ, or young, which the insects carry about in their mandibles, seeking a place of retreat, is very apparent.

The inhabitants of an ants'-nest consist of males, females, and workers, besides eggs, larvæ, and pupæ. The males and females have at first, when they emerge from the pupa state, four delicate transparent wings; the workers, or neuters, which are really imperfect females, never have wings. In some species the neuters are of two dimensions, some greatly exceeding the others in bulk, as in Formica rufa and F. flava, but no difference has been discovered in the labours which devolve upon them. They defend the community, they nurse and feed the larvæ, they forage for provisions, they form roads, build and repair the nest or formicary, they guard the queens, and attend to their wants, and in some cases they assemble for the purpose of carrying on a warfare against the tenants of other settlements. But before we enter into a detail of the operations of these curious insects, let us glance at their nests or cities, which are more ingeniously constructed than might on a cursory glance be supposed.

The turf-ant (Formica cæspitum), a very small dusky-brown species, common in gardens and fields, is usually found to select a tuft of herbage, or long grass, the stems of which serve to support the dome-like top and walls, while the blades spread over it. The structure of this tenement is very slight, and consists of small grains of earth, piled up without any other cement than water, or the dew or moisture of the ground, which produces a sufficient degree of adhesion between the particles; we have seen it made almost wholly of grains of sand, which are so skilfully

arranged as to retain their position. Internally are galleries and various chambers. Often this species hollows out galleries and chambers beneath stones.

The yellow ant (Formica flava) uses the dust of decayed wood, or particles which it gnaws from mouldering logs or trees, and mixes this material by means of its mandibles with earth and spiders' webs, thus forming it into a sort of rude papier-mâché, with which it builds the stages, chambers, and galleries of its edifice.

The nest of the fallow-ant, horse-ant, or wood-ant (Formica rufa), the largest of our British species, and which is common in woods and pleasure-grounds, presents a very rude appearance; externally it appears nothing more than a hillock of sand, earth, bits of wood, dried particles of leaves, bits of twigs, and even grains of corn, all confusedly jumbled together and forming a mass of considerable size. Internally it contains numerous chambers, arranged in separate stories, some of which are deep in the earth, which the colony has excavated; others in the centre, and even near the surface of the hillock, and communicating with each other by means of galleries; while other passages lead to the outside, the doors of which are kept shut or open according to the state of the weather, but are always closed up at night. The brown ants (F. fusca) make storied habitations of clay, in the raising of which they show equal ingenuity and industry.

The societies of the fuliginous or jet ant (Formica fuliginosa) make their habitations in the trunks of old oaks or willows, in which, with their strong mandibles, they work out horizontal galleries, separated from each other by thin partitions, and communicating with each other; sometimes these galleries appear like halls supported by rows of pillars. Of these pillared halls, story rises above story, presenting a delicate and elaborate specimen of carved-work, stained black, but whether in consequence of the exposure of the wood to the atmosphere, of some emanation from the ants, or the action of formic acid (a peculiar acid secretion found in these insects *), is not apparent.

Did space allow, we might here enlarge upon the wonderful structures made by ants in the warmer portions of the globe, and which have attracted the notice of travellers. Malouet saw in Guiana ant-hills from fifteen to twenty feet in height, and from thirty to forty feet in circumference at the base, of a pyramidal figure, but was deterred from approaching them within forty paces, by the fear of being devoured. Stedman, when in Surinam, passed an ants'-nest six feet in height, and one hundred in circumference. Mr. Darwin says, "A person on first entering a tropical forest (in South America) is astonished at the labours of the ants; well-beaten paths branch off in every direction, on which an army of never-failing foragers may be seen, some going forth, others returning burdened with pieces of green leaf often larger than their own bodies." It is perhaps of the same species that Dampier speaks, when he describes a small yellow ant of South America, whose sting is like a spark of fire, and which makes nests in great trees, placed on the body between the large bifurcations, often equalling a hogshead in size: these nests are their winter retreats. Great paths through the woods, of the breadth of four inches, are trodden by them, and thousands may be seen returning laden with portions of green leaf, so large that he could scarcely see the insect for its burden: the path looked a moving line of green. In Australia a species of ant builds a curious nest in the trees by bending down several adjacent leaves, and glueing them together so as to form a purse. "Their method of first bending down the leaves," says Hawkesworth, in his account of Cook's first voyage, "we had no opportunity to observe, but we saw thousands uniting all their strength to hold them in this position, while other busy multitudes were employed within in applying the gluten that was to prevent their returning back. To satisfy ourselves that the leaves were bent and held down by the efforts of these diminutive artificers, we disturbed them in their work; and as soon as they were driven from their stations, the leaves on which they were employed sprang up with a force much greater than we could have thought them able to conquer by any combination of their strength: but though we gratified our curiosity at their expense, the injury did not go unrevenged, for thousands immediately threw themselves upon us, and gave us intolerable pain with their stings, especially those which took possession of our necks and hair, whence they were not easily driven."

The same writer describes a black species of New South Wales, which excavates the branches of trees by working out the pith almost to the extremity of the slenderest twig, the tree at the same time flourishing as if it had no such inmates. "On breaking off a branch, the travellers were instantly covered with thousands of those insects, which inflicted their stings with incessant violence. Other species make huge nests of clay in the trees, conspicuous at a great distance.

But we must return to our immediate subject. In the month of August or September, if an ant's nest be watched some glowing day, thousands of winged ants will be seen issuing forth, rising in the air with a slow movement, settling on gates, stones, posts, &c. These are the males and females which have just emerged from the pupa state, and attained their complete development. The clouds of these which are sometimes seen are astonishing: the swarms of a whole district seem to assemble together, and rise in the air like columns of vapour, whirling and twisting about as the living myriads composing the mass change their position. Various instances of this extraordinary swarming of ants are on record. Messrs. Kirby and Spence say "that when Colonel Sir Augustus Frazer, of the Horse Artillery, was surveying, on the 6th of October, 1813, the scene of the battle of the Pyrenees from the summit of the mountain Pena de Aya, or Les Quatres Couronnes, he and his friends were enveloped in a swarm of ants so numerous as entirely to intercept their view, so that they were glad to remove to another station to get rid of them." Mr. Gleditsch, in the 'History of the Berlin Academy' for 1749, describes swarms of a small black ant which appeared in Germany, and formed high columns in the air, rising to a vast height, and agitated with a curious intestine motion somewhat resembling the aurora borealis. We might add numerous other instances: we have ourselves, on more than one occasion, seen immense swarms. It is now that the males and females pair, and were it not for the destruction that takes place, greatly reducing the numbers of the females, ants would be one of the pests of mankind; as it is, in some countries they are sufficiently obnoxious. Birds prey upon them; millions perish in rivers, ponds, and lakes, and are snapped up by various fishes. With respect to the males, they all perish; the end of their existence is accomplished; and they have neither sting for defence nor strong jaws for needful labour and the acquisition of food. All the females, which are easily known by their size and the expansion of their wings, and all the males, do not leave the original nest; or if they do, the workers scatter themselves abroad in quest of fertile females, and taking them prisoners, re-conduct them to the nest, dragging them along by force, and vigilantly guarding them lest they

* Messrs. Kirby and Spence say that Fourcroy and Vauquelin have ascertained that the acid of ants is a mixture of the acetic and malic. It is very copious and pungent.

should escape, which they seem always disposed to do. In a short time they lose their wings, which, no longer needed, fall off, or, as Huber affirms, are purposely plucked off; and the process of laying the eggs commences. Numerous females, however, escape, and become the founders of distinct colonies: they lose or tear away their wings, begin to construct a cell, lay their eggs, and soon are accompanied by a crowd of workers. Solitary females may be often discovered thus engaged.

With respect to imprisoned females, of which there are sometimes several in a single nest, they are attended each by a worker, who supplies their wants: they exhibit no rivalry, but crowds follow in their train; and when they lay their eggs, these are taken by the workers and arranged in the cell she is at the time occupying. According to Huber, when a female is acknowledged as a parent, the workers begin to pay her homage, very similar to that which the bees render their queen: they press round her, offer her food, conduct her by her mandibles through the labyrinthine galleries, and carry her over the steep or difficult passages, while she coils herself round, so as to incommode her bearers as little as possible. "In whatever apartment," says Mr. W. Gould ('Account of English Ants,' 747), "a queen condescends to be present, she commands obedience and respect. A universal gladness spreads itself through the whole cell, which is expressed by particular acts of joy and exultation: they have a peculiar way of skipping, leaping, standing on their hind legs, and prancing with the others. These frolics they make use of both to congratulate each other when they meet, and show their regard for the queen; some of them gently walk over her, some of them dance round her: she is generally encircled by a cluster of attendants, who, if you separate them from her, soon collect themselves into a body, and inclose her in the midst." Huber says that even if she dies, they sometimes continue for months the same attentions to her,—brush her, lick her, and treat her with the same courtly formality as if she were alive.

[To be continued.]

USES OF THE CHESTNUT-TREE.

The name *chestnut* has been applied to two trees differing considerably in their character; the one being included by botanists under the order Corylaceæ, and the other under the order Æsculaceæ. The first yields the *sweet chestnuts*, eaten as fruit; while the other yields what are termed 'horse-chestnuts;' which name seems to have been given because the form and colour of the nuts are somewhat similar to those of the sweet chestnut, and because they are said to be used in some countries as a horse-medicine. The uses of these two trees are principally in relation to the wood and the nut; but there are a few others which may deserve a brief notice.

In most countries the sweet chestnut-tree is cultivated more for its fruit than any other product. The tree attains a height of from sixty to eighty feet in fifty or sixty years; before which period its timber is generally in the highest state of perfection; but the tree will live for a very long period afterwards, although its timber, unlike that of the oak, deteriorates as it grows older, becoming decayed and brittle. There is a chestnut-tree at Tortworth which is supposed to have been planted before the Norman conquest; but its timber would probably be found almost valueless.

From the property of chestnut-wood, of being more durable when young than when old, it is very valuable for posts, fencing-poles, stakes, hoops, &c.; the sap or outer wood very soon changing into heart-wood. Much mistake has arisen from a certain resemblance which chestnut-wood bears to oak under some circumstances. A belief long and generally prevailed, and partially exists at present, that the roofing and main beams of many of our ancient buildings and houses were formed of the chestnut; but repeated and careful examinations have shown that in most, if not all such instances, the timber of the oak, and chiefly of the sessile-fruited kind, has been mistaken for chestnut. Mr. Selby remarks that "the wood of the oak, more particularly that of the sessile-fruited variety, assumes in course of time a near resemblance in colour to that of the chestnut in its best condition, or when young and untainted at heart; and as few chestnuts could have acquired the scantling frequently observed in the timbers of these ancient buildings at the age when decay almost invariably commences, this, in fact, furnishes a strong argument against the use of chestnut timbers and beams by our ancestors, inasmuch as the trees must have become unfit for the purpose long before they had attained the necessary dimensions." According to Mr. Loudon, the two kinds of timber may be distinguished by the transverse fibres of the chestnut being more confused, and much less evident to the naked eye, than those of the oak; so that, to ascertain whether a plank of timber is oak or chestnut, it is only necessary to saw off a thin slice at one of its extremities.

From some peculiarities in its growth the chestnut trunk is apt to become rent with fissures proceeding from the centre to the circumference; and this circumstance renders the wood more fitted for laths or fencing than for beams or planks. Chestnut-wood is stated by some French writers to be much used for making wine-casks; the wine being said to ferment more slowly, to evaporate less rapidly, and to contract less unpleasant taste from the wood, than in casks made of any other kind of wood. Allusion is made in a French poem to

> "Close grain'd chestnut, wood of sovereign use
> For casking up the grape's most powerful juice."

Chestnut-wood makes capital hoops, from a property which it seems to possess of resisting the dry-rot in cellars, where other woods are likely to decay. At La Bresse, in France, posts of chestnut are preferred to those of every other wood for forming the supports of huts.

Evelyn speaks thus of the timber:—"The chestnut is, next the oak, one of the most sought after by the carpenter and joiner. It hath formerly built a good part of our ancient houses in the City of London, as does yet appear. I had once a very large barn next the City, framed entirely of this timber: and, certainly, the trees grew not far off, probably in some wood near the town; for in the description of London written by Fitz-Stephen, in the reign of Henry II., he speaks of a very noble and large forest which grew on the boreal part of it, and which was well stored with all sorts of good timber." Mr. Loudon remarks on this passage, that Evelyn evidently here fell into the common error of confounding the chestnut with the oak. Other parts of Evelyn's description are quaint enough:—"If the timber be dipped in scalding oil, and well pitched, it becomes extremely durable; but otherwise, I cannot celebrate the tree for its sincerity, it being found that, contrary to the oak, it will make a fair show outwardly, when it is all decayed and rotten within; but this is in some sort recompensed, if it be true that the beams made of chestnut-tree have this property—that, being somewhat brittle, they give warning, and premonish the danger by a certain crackling; so as, it is said, to have frighted those out of the baths at Antandro, whose roof was laid with

this material, but which, Pliny says, was of hazel, very unlike it."

Mr. Loudon quotes, one by one, the opinions expressed by various writers as to beams of ancient buildings being formed of chestnut. Evelyn, Cook, Miller, Marshall, Gilbert White, Pontey, Mitchell, and Mathew—all English writers who have at different times described chestnut timber—appear to have fallen into the opinion which is now regarded as an error. The real excellence of chestnut-wood seems to be indicated in the following remarks by Mr. Kent, who communicated his opinions some years ago to the Society of Arts:—"The branch or limb of a chestnut, about thirteen inches square, which in the year 1726 was put down as a hanging-post for a gate, carried the gate without alteration fifty-two years; when, upon altering the enclosures of the farm where it stood, it was taken up under my direction, and appearing to be perfectly sound, was put down for a clapping-post in another place. In 1743 a large barn was built with some of this timber, and is now (1792) as sound in every part, beams, principals, and spars, as when first the barn was built. About the same time several chestnut posts and rails were put down, which I have since seen removed; and after standing thirty or forty years, they generally appeared so sound as to admit of being set up in some other place. The last instance I shall mention, though not of long date, will show the great superiority of this timber over oak in fences. In the year 1772 the present Mr. Windham made a large plantation in his park, which was fenced with posts and rails, converted from young oaks and chestnuts of the same age and scantling, such as were picked out of a place where they stood too thick. Last year, upon Mr. Windham's enlarging this plantation, it was necessary to remove this fence; when the chestnut-posts were found as sound as when they were first put down, but the oak were so much wasted just below the surface of the ground, that they could not be used for the same purpose again without the assistance of a spur to support them."

The fruit of the chestnut is well known in most European countries. In England they are eaten raw, roasted, stewed with cream, made into soup either with milk or gravy, stewed with salt-fish, or used as a stuffing for fowls and turkey; though the first two modes are most common. Evelyn, after reproaching Englishmen for giving "to our swine that which is amongst the delicacies of princes in other countries," speaks of the chestnut as "a lusty and masculine food for rustics at all times, and of better nourishment for husbandmen than calc and rusty bacon; yea, or beans to boot." He recommends them to be dressed in the various ways which "our French cooks teach us," as he considers them to be the parent of many disorders when eaten raw.

It is on the Continent, however, that the fruit of the chestnut is made most available as an article of food. In the south of France and the north of Italy, it serves in a great measure as a substitute for bread and potatoes. As a means of preserving the chestnuts during winter, great care is taken to gather and dry them. When the nuts are ripe, those that are to be preserved are collected every day from the ground on which they have fallen from the trees, and spread out on a dry airy place till the whole are gathered together. Those which remain on the trees are knocked off by means of long poles. The nuts laid by for winter vegetable are those which fall off the trees; while those which are beaten off are carried to Paris, or to the local markets, for immediate use. As a means of depriving the nuts of their husks, they are trodden under foot by men wearing 'sabots' or wooden shoes; or if the nuts are to be preserved for a short time, they are kept in their husks, either in barrels of sand or in heaps in the open air.

Mr. Loudon state the modes of using the chestnut in France to be as follows:—One of the modes of drying the nuts in order to preserve them for several years, is to place those which have been collected from the ground on coarse riddles, sieves, or hurdles, in a dry airy place, and afterwards to expose them to the sun; or to boil them for a quarter of an hour, and then dry them in an oven. In Limousin and Perigord, where the chestnut-flour is used for making the kind of cake called *la galette*, and the thick porridge called *la polenta*, which are the common food of the peasantry, the chestnuts are dried with smoke. A thin layer of nuts, which have been deprived of their husk, is laid on a kind of kiln pierced with holes; and a fire is made below with the husks and a part of the wood of the tree, which is permitted to smoulder, but not to burst into flame. In a short time the superabundant moisture oozes through the skins of the nuts; and the fire being then extinguished, the nuts are allowed to remain till cold. They are then thrown on one side, and a fresh layer is spread out, and subjected to the same process. When a sufficient quantity of chestnuts is thus prepared, to cover the floor of the kiln to a depth of one foot, they are laid upon it, and a gentle fire is made below, which is gradually augmented during two or three days, and is then continued during nine or ten days, the chestnuts being regularly turned till the nuts part readily from their skins. They are then put into sacks, which have been previously wetted, and threshed with sticks, or rubbed upon a large bench or table; after which they are winnowed, and are then ready for the mill. During the process of drying, the fire is watched night and day; and the under side of the floor of the kiln is frequently swept from the soot. The dust which results from the winnowing of the nuts, as well as the broken nuts, are used for feeding cattle.

The *galette* and the *polenta* are thus prepared:—The galette is a species of thick flat cake, made from the chestnut-flour, which flour, it kept in casks or in corked earthen bottles, will remain good for years. The cake is made without yeast, but contains milk and a little salt, and sometimes eggs and butter. It is baked either on an iron plate or on a hot flat stone. The *polenta* is made by boiling the chestnut-flour in water or milk, and continually stirring it, till it has become quite thick, and will no longer stick to the fingers. When made with water, it is frequently eaten with milk, in the manner of Scotch oatmeal 'parritch.' Another dish, called *chatigna*, is made by boiling the entire chestnuts, after they have been dried and freed from their skins, in water with a little salt, till they become soft, and then breaking and mixing them together like mashed potatoes. A sweetmeat, called *marrow glace*, is made by dipping the nuts into clarified sugar, and then drying them, producing a 'bon-bon' analogous to sugared almonds. The nuts are frequently cooked in France by boiling them in water containing the leaves of celery, sage, or any other flavouring herb. In Evelyn's time chestnuts appear to have been eaten as a luxury, in combination with wine, sugar, juice of lemon, fennel, cinnamon, nutmeg, rose-water, and various other delicacies, one or other of which was combined in various ways with the chestnuts.

Twenty thousand bushels of chestnuts are annually imported into England from Spain; whence they are generally known in this country as 'Spanish' chestnuts.

As respects the *horse-chestnut*, a very few details will suffice. The timber is not very strong or durable, but it is used as boards for flooring, cart-linings,

packing-cases, &c.; for sabots, or wooden shoes; and for water-pipes. When burned, the charcoal is sometimes used in gunpowder-making; and the ashes afford a considerable quantity of potash. The bark is occasionally used for tanning, for dyeing yellow, and as a medicinal substitute for Jesuits' bark. The nuts in Turkey are ground and mixed with horse-food; and in their natural state they are eaten by goats, sheep, and deer. They possess a detergent quality, and serve in some degree as soap. They are used in Ireland to whiten flaxen cloth, and for this purpose are rasped into water, when they are allowed to macerate for some time. When ground into flour, and mixed in the proportion of one-third with wheat-flour, they are said to add to the strength of book-binders' paste. It has been proposed in France to extract a starch from the nut, to ferment this starch into sugar, and thence to produce spirit; but we do not know whether this has ever been done, though the fruit of the real or Spanish chestnut has been made to yield sugar, in greater proportion, it is said, than from beet-root.



[North Wall of Richborough.]

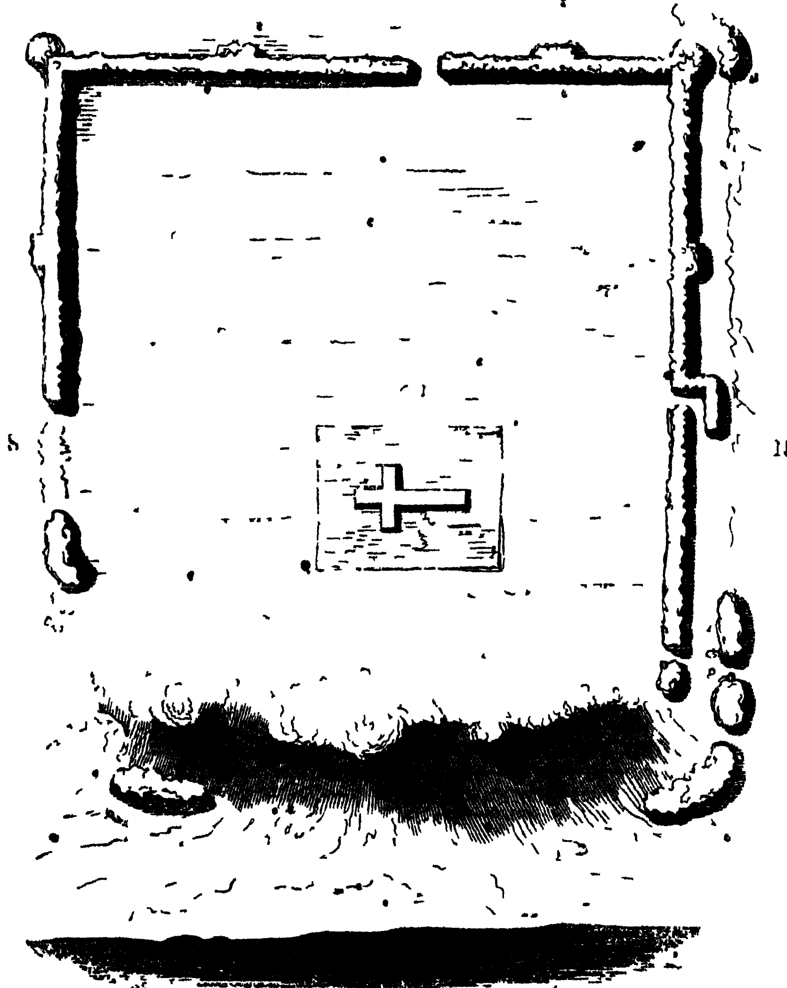
RICHBOROUGH AND RECULVER.

[From 'Old England.']

It was a little before the commencement of a glorious corn-harvest that we first saw Richborough. Descending from the high fertile land of the Isle of Thanet, we passed Ebbefleet, the spot in Pegwell Bay where tradition says Hengist and Horsa landed, to carry war and rapine into the country. The coast here wears an aspect of melancholy dreariness. To the east we looked back upon the bold cliff of Ramsgate; to the west, upon the noble promontory of the South Foreland. But all the land space between these two extremities of the bay is a vast flat, drained in every direction by broad ditches, amidst which, in propitious seasons, thousands of sheep find a luxuriant though coarse pasture. At low-water the sea retires many furlongs from this flat shore; and then, the fisher-boy fills his basket with curious shells, which are here found in great variety. When the tide has ebbed, a narrow stream may be traced for a long distance through the sand, which, when the salt wave has receded, still fills the little channel into which it empties itself from its inland source. This is the river Stour, whose main branch, flowing from Ashford by the old Roman Castle of Chilham, and onward to Canterbury, forms the boundary of the Isle of Thanet on the south-west; and making a sudden bend southerly to Sandwich, returns again in a northerly direction to empty itself into its sea-channel in Pegwell Bay. The road crosses the peninsula which is formed by this doubling of the river. At about a mile to the west is a gentle hill crowned with a large mass of low wall. At the distance of two or three miles we distinctly see that this is some remarkable object. It is not a lofty castle of the middle ages, such as we sometimes look upon, with tower and bastion crumbling into picturesque ruin; but here, on the north side, is a long line of wall, without a single aperture, devoid alike of loophole or battlement, and seemingly standing there only to support the broad masses of ivy which spread over its surface in singular luxuriance. We take boat at a little ferry-house, at a place called Saltpans. Leland, when he went to Richborough three hundred years ago, found a hermit there; and he says, "I had antiquities of the heremite, the which is an industrious man." So say we of the ferry-man. He has small copper coins in abundance, which tell what people have been hereabout. He rows us down the little river for about three-quarters of a mile, and we are under the walls of Richborough Castle. This is indeed a mighty monument of ages that are gone. Let us examine it with somewhat more than common attention.

Ascending the narrow road which passes the cottage built at the foot of the bank, we reach some masses of wall which lie below the regular line (See the Plan). Have these fallen from their original position, or do they form an outwork connected with fragments which also appear on the lower level of the slope? This is a question not very easy to decide from the appearance of the walls themselves. Another question arises, upon which antiquarian writers have greatly differed. Was there a fourth wall on the south-eastern side facing the river? It is believed by some that there was such a

wall, and that the castle or camp once formed a regular parallelogram. It is difficult to reconcile this belief with the fact that the sea has been constantly retiring from Richborough and that the little river was undoubtedly once a noble estuary Bede, who wrote his 'Ecclesiastical History' in the beginning of the eighth century, thus describes the branch of the river which forms the Isle of Thanet, and which now runs a petty brook from Richborough to Reculver "On the east side of Kent is the Isle of Thanet, considerably large, that is, containing, according to the English way of reckoning, six hundred families, divided from the other land by the river Wantsum, which is about three furlongs over, and fordable only in two places, for both ends of it run into the sea" Passing by the fragments of which we have spoken, we are under the north (strictly north-east) wall,—a wondrous work, calculated to impress us with a conviction that the people who built it were not the petty labourers of an hour, who were contented with temporary defences and frail resting-places The outer works upon the southern cliff of Dover, which were run up during the war with Napoleon at a prodigious expense, are crumbling and perishing, through the weakness of job and contract, which could not endure for half a century And here stand the walls of Richborough, as they have stood for eighteen hundred years, from twenty to thirty feet high, in some places with foundations five feet below the earth, eleven or twelve feet thick at the base, with their outer masonry in many parts as perfect as at the hour when their courses of tiles and stones were first laid in beautiful regularity. The northern wall is five hundred and sixty feet in length. From the eastern end, for more than two-fifths of its whole length, it presents a surface almost wholly unbroken. It exhibits seven courses of stone, each course about four feet thick, and the courses separated each from the other by a double line of red or yellow tiles, each tile being about an inch and a half in thickness The entrance to the camp through this north wall is very perfect, of the construction marked in the Plan. This was called by the Romans the Porta Principalis, but in after times the Postern-gate. We pass through this entrance, and we are at once in the interior of the Roman Castle. The area within the walls is a field of five acres, covered, when we saw it with luxuriant beans, whose green pods were scarcely yet shrivelled by the summer sun Towards the centre of the field, a little to the east of the postern gate, was a large space where the beans grew not The area within the walls is much higher in most places than the ground without, and therefore the walls present a far more imposing appearance on their outer side As we pass along the north wall to its western extremity,



[Plan of Richborough.]

it becomes much more broken and dilapidated; large fragments having fallen from the top, which now presents a very irregular line. It is considered that at the north-west and south-west angles there were circular towers. The west wall is very much broken down; and it is held that at the opening (see the Plan) was the Decuman gate (the gate through which ten men could march abreast). The south wall is considerably dilapidated; and from the nature of the ground is at present of much less length than the north wall. Immense cavities present themselves in this wall, in which the farmer deposits his ploughs and harrows, and the wandering gipsy seeks shelter from the driving north-east rain. One of these cavities in the south wall is forty-two feet long, as we roughly measured it, and about five feet in height. The wall is in some places completely pierced through; so that here is a long low arch, with fifteen or eighteen feet of solid work, ten feet thick, above it, held up almost entirely by the lateral cohesion. Nothing can be a greater proof of the extraordinary solidity of the original work. From some very careful engravings of the external sides of the walls, given in King's 'Munimenta Antiqua,' we find that the same cavity was to be seen in 1775.

[To be continued.]

THE MINING-LAWS OF CORNWALL AND DERBYSHIRE.

Some of the mines of England have been worked for such a long series—not only of years, but of centuries—that the laws relating to them pertain in a singular manner to those of ages long gone by; the miners having formed communities in some respects isolated and distinct from other classes of society, yet remarkably consistent and uniform throughout successive centuries. The tin-mines of Cornwall and the lead-mines of Derbyshire are among those which exhibit instances of local regulations having almost the force of statutary enactments.

The growth of the mining-laws in Cornwall may be traced to periods long anterior to the Conquest. Whether the Phœnicians and the Greeks interested themselves in the management of the tin-mines of Cornwall, or whether they only came to Britain as purchasers of the metal procured, is not now known; but it is supposed that at a later period the Romans worked the mines, employing the native Britons as miners. It does not appear that the mines were much attended to during the troubled wars of the Saxons and Danes; but when the Normans came over, they immediately perceived the value of these mineral stores, and made arrangements for their efficient working. In the time of King John the right of working for tin was vested wholly in the king, in his capacity of Earl of Cornwall; the mines being farmed or leased to Jews, who seem to have paid but a small sum annually to the king. John granted a few immunities and privileges to the miners, as a means of developing the resources; but the disturbances of the two following reigns caused the mines to be neglected. Under these circumstances a few Cornish gentlemen succeeded in obtaining a charter and grants, by virtue of which they might establish a court of judicature and a kind of parliament, manage and decide all mining disputes, and collect a toll or due of one-fifteenth of all the tin raised. The tin-grounds were at the same time bounded or separated into portions, as an encouragement to the labouring tinner to search for tin, by acquiring a property in the lands where he might discover it; and for the better promotion of tin-working in waste and uninclosed grounds, every tinner had liberty to labour in searching for tin. When he had discovered a 'lode,' or vein, and had given due notice to the Stannary Court, or Mining Parliament, he marked out the ground in which he chose to pursue his discovery, by digging a small pit at each angle of the boundary; by which means he acquired a right, in all future workings in that ground, either to work himself, or to set others to work for him, reserving to the lord of the soil one-fifteenth part of all tin raised therein. The boundary-pits were to be renewed every year, by cutting the turf and clearing up the dirt and rubbish which fell into them, in order that the range of each man's privileges should be strictly defined. As a return for all these privileges, the earls of Cornwall were to receive four shillings for every hundredweight of white tin raised; a rate of duty six times as great as that paid by the miners of Devonshire, who did not receive equal privileges. In order the better to secure the payment of this tax, it was agreed that all tin should be brought to places purposely appointed by the earl, there to be weighed and kept till the earl's dues were paid.

The above regulations began to be regarded as a kind of mining charter. In the 33rd of Edward I. the charter was confirmed; and the miners had the liberty of selling each man his own tin how he pleased, unless the king required to purchase it himself. This charter formed the basis for other arrangements, which were made the subjects of local enactment in the reigns of Edward III., Richard II., Edward IV., Edward VI., Mary, and Elizabeth. Some of these regulations had for their object the division of the Cornish tinners, who had before been regarded as one body, into four parts, named from the places of the principal tin-workings at that time, Fowey Moor, Trewarnheyl, Blackmoor, and Penrith. One general warden was constituted to do justice in law and equity, with an appeal from his decision to the Duke of Cornwall in Council only, or, in lieu thereof, to the Crown. The Lord Warden appointed a Vice-Warden to determine all stannary disputes every month (the word 'stannary' alluding to all matters connected with the tin-mines, from the Latin name for tin, "stannum"). He constituted also four stewards, one for each of the stannary precincts, who held their court every three weeks, and decided by juries of six persons; with an appeal reserved to the Vice-Warden, thence to the Lord Warden, and lastly to the Lords of the Council.

In the reign of Henry VII. a circumstance occurred which for a time disturbed the operation of these laws. The Duke of Cornwall made certain ordinances relating to the stannaries, which the tinners refused to observe; and as they indulged themselves in irregularities not consistent with their charter, the king declared it forfeited. On their submission, however, he granted a new charter, in which he restored all their former privileges: and enlarged them with this important addition, that no law relating to the tinners should be enacted without the consent of twenty-four gentlemen-tinners, six to be chosen by a mayor and council in each of the stannary divisions. This charter was confirmed by Elizabeth; and it being found inconvenient that the consent of the whole twenty-four should be required, it was declared that the consent of sixteen stannators, or members of the stannary parliament, should be sufficient to enact any law. Under the operation of this rule, when any new difficulties occurred, or when new laws became necessary for the better direction of the tinners and their proceedings, or when a more explicit declaration and enforcement of the old laws became necessary, the Lord Warden, by commission from the Duke of Cornwall or from the Crown, issued his precept to the four principal towns of the stannary districts, viz. Launceston for Fowey Moor, Lostwithiel for Blackmoor, Truro for Trewarnheyl, and Helston for Penrith; each town choosing six

members, and the whole twenty-four so chosen, called stannators, constituting the parliament of tinners. In the reign of Charles II. an extension took place, by the occasional choice of six 'assistant stannators' from each district, in cases of importance.

A few changes have been made since that time, and the present regulations may be stated nearly as follows:—The Duke of Cornwall has his Chancellor, Attorney-General, Solicitor-General, and Exchequer Court; but the tin-miners and their affairs are under the peculiar jurisdiction of the Stannary Courts, headed by the Lord Warden and the Vice-Warden. The miners claim to be free from all jurisdiction but that of the Stannary Courts, except in cases affecting land, life, or limb. The Vice-Warden's Court is held once a month, and is a court of equity for all matters relating to the tin-mines and trade; no writ of error lies to the Court at Westminster, but there is an appeal to the Lord Warden, and from him to the Duke in Council. Issues are frequently directed by the Vice-Warden to be tried in the Stannary Courts, which are held, at the end of every three weeks, before the Steward of each of the four stannaries or mining districts. In these courts all civil actions, in which either plaintiff or defendant is a privileged tinner, are tried before the Steward and a jury: an appeal lying from these courts to the Vice-Warden, and from him to the higher authorities. The twenty-four stannators, chosen by the four districts, do not take cognizance of the execution of the laws on the trial of causes; their duties being legislative or parliamentary, and not executive. The stannary laws are revised, or new ones enacted, by this body, in conjunction with the Duke and his Council, the stannators being gentlemen of property in the mining districts. The holding of a Stannary Parliament is a rare occurrence, the mining-laws being clearly explained and well understood by those who have to act under them; indeed it is said that a century has nearly elapsed since such an assemblage took place. The laws are embodied in a code, and have been often published. The ancient records of the stannaries were kept at Lostwithiel, till they were burned in the great civil war of Charles I., in 1644, by the parliamentary army.

We will next glance at the mining-laws of Derbyshire. This county presents a striking contrast to Cornwall, in respect to the comparative desertion of the mines; for it is supposed the annual produce of the lead-mines of the first-named county is not one-sixth of what it was fifty years ago. There are two-hundred and twenty Derbyshire lead-mines, of which several, now exhausted, form the celebrated caves of that county. Some of these mines can be proved to have been worked by the Saxons, while others can be traced as far back as the time of the Romans. The termination of the working of many of the mines has been occasioned by the circumstance that, as the veins of ore become less in dimensions as they descend, they are at length too little valuable to render further working profitable.

The mining-laws at present in force in Derbyshire are said to apply only to that part of the county known as the King's Field, or hundreds of High Peak and Wirksworth, extending to Crick; and that within this limit the mining rights of the Crown are confined to such land and manors as belonged to the Duke of Lancaster. In the King's Field certain officers are appointed, called 'bar-masters,' who hold mineral courts, at which a jury of twenty-four men decide all questions or disputes regarding the *cope*, or duties payable to the king or his man, or lessee, and who have also a power of determining all disputes or questions, and, in certain cases, of enforcing the payment of debts incurred in the working of mines.

Many of the laws originated in the very infancy of the system, when the mines were worked by manual labour only, and from this circumstance they seem singularly primitive and rude. Upon a person finding a vein of ore, the laws require him to make a cross upon the ground as a mark of possession, giving notice at the same time to the bar-master, who attends and receives a measure or dish of ore, being the first produce of the mine. This appears to be a preliminary condition for allowing him to proceed in working his *meer*, or measure of twenty-nine yards in length of vein; the bar-master at the same time taking possession of the next half-meer (fourteen yards and a half) for the king. This half-meer, after being valued by experienced persons, is sold to the adjoining meer-holder. If the vein promise well, applications are made for the next meer, the same form being observed; and, when there are a number of partners concerned in working the vein, they are termed 'grove-fellows.' The mining laws require not merely the discovery of a vein of ore (of which there are many that have little or no lead), but that has been worked so far as to produce the 'king's dish.' This king's dish alludes to the duty or share paid to the king. A dish of ore, in the Low Peak district, is a rectangular box, twenty-eight inches long, six inches wide, and four inches deep, holding fourteen Winchester pints: the High Peak dish is somewhat larger, holding sixteen pints: but in either case every twenty-fifth dish belongs to the king, and is considered his share of the produce. A small portion also goes as tithe, and another small portion to the lord of the manor.

The mode pursued in working the first mines was what is termed 'open-work;' that is, the surface-soil was first removed, and the ore then dug out with mattocks, picks, hammers, and wedges. *Stowses* or windlasses were then erected over the open gaps, by which the refuse earth was drawn to the surface. A number of *meers* was thus worked in a parallel line, strict laws being made and enforced by the mining courts to prevent the occupiers of the soil from levelling or meddling with these dangerous and unsightly apertures. As the mines, however, increased in depth, horse-gins were erected for drawing the ore and water; and the mines or meers became consolidated by the property of them being united, the meers being also connected below the ore and vein, and the produce being drawn up vertical shafts. Still the old laws relating to the stowse had to be attended to; for by these laws each meer was to have a stowse to itself, and this stowse was to be used, once in three weeks at least, to draw up the ore from the meer. But when the meers became consolidated into larger property, and the shafts sunk, the stowses were no longer wanted; yet a model of a stowse, or sham drawing-apparatus, was put over the meer, as a means of keeping rightful possession of the meers on a consolidated mine. A writer in the 'Mining Review' observes that even now this subterfuge "is so rigidly enforced, that a mine on which steam-engines and gins are erected is not held to be legally occupied, except one of those pigmy memorials of the antient mode of drawing ore is constantly kept 'in sight of all men.' The mining laws punish by fines all persons detected removing the bar-master's stowses, even if placed in the middle of a cultivated field, a common, or a fence wall. These models, to be legal, must have no nails in their structure, as primitively made. The bar-master charges a small sum for these shams, and the miners are obliged to be particular in replacing them when broken or destroyed." This is a very curious instance of what frequently meets our attention, viz., the retention of the letter of the law, when its spirit has evaporated.



[Death of Sir Roger de Coverley communicated to the Club.]

SIR ROGER DE COVERLEY. No. XII.

We now conclude this series of Papers, which, independent of their high reputation and sterling merit, have possibly received an additional attraction from the illustrations of Mr. Harvey. The account of the death of Sir Roger is in Addison's best style. It is said that he killed his good knight to prevent others misrepresenting his actions and character. It certainly was not easy to preserve the true balance between our amusement at the eccentricities of his hero and our love for his goodness, as Addison alone has preserved it. Steele vulgarised Sir Roger.

"We last night received a piece of ill news at our club, which very sensibly afflicted every one of us. I question not but my readers themselves will be troubled at the hearing of it. To keep them no longer in suspense, Sir Roger de Coverley is dead! He departed this life at his house in the country, after a few weeks' sickness. Sir Andrew Freeport has a letter from one of his correspondents in those parts, that informs him that the old man caught a cold at the county sessions, as he was very warmly promoting an address of his own penning, in which he succeeded according to his wishes. But this particular comes from a Whig justice of peace, who was always Sir Roger's enemy and antagonist. I have letters both from the chaplain and Captain Sentry, which mention nothing of it, but are filled with many particulars to the honour of the good old man. I have likewise a letter from the butler, who took so much care of me last summer when I was at the knight's house. As my friend the butler mentions, in the simplicity of his heart, several circumstances the others have passed over in silence, I shall give my readers a copy of his letter, without any alteration or diminution.

'Honoured Sir,

'Knowing that you was my old master's good friend, I could not forbear sending you the melancholy news of his death, which has afflicted the whole country, as well as his poor servants, who loved him, I may say, better than we did our lives. I am afraid he caught his death the last county sessions, where he would go to see justice done to a poor widow woman and her fatherless children, that had been wronged by a neighbouring gentleman; for you know, Sir, my good master was always the poor man's friend. Upon his coming home, the first complaint he made was, that he had lost his roast-beef stomach, not being able to touch a surloin, which was served up according to custom; and you know he used to take great delight in it. From that time forward he grew worse and worse, but still kept a good heart to the last. Indeed we were once in great hopes of his recovery, upon a kind

message that was sent him from the widow lady whom he had made love to the forty last years of his life; but this only proved a lightning before death. He has bequeathed to this lady, as a token of his love, a great pearl necklace and a couple of silver bracelets set with jewels, which belonged to my good old lady his mother. He has bequeathed the fine white gelding that he used to ride a-hunting upon to his chaplain, because he thought he would be kind to him; and has left you all his books. He has, moreover, bequeathed to the chaplain a very pretty tenement with good lands about it. It being a very cold day when he made his will, he left for mourning to every man in the parish a great frieze coat, and to every woman a black riding-hood. It was a most moving sight to see him take leave of his poor servants, commending us all for our fidelity, whilst we were not able to speak a word for weeping. As we most of us are grown grey-headed in our dear master's service, he has left us pensions and legacies, which we may live very comfortably upon the remaining part of our days. He has bequeathed a great deal more in charity, which is not yet come to my knowledge, and it is peremptorily said in the parish, that he has left money to build a steeple to the church; for he was heard to say some time ago, that if he lived two years longer, Coverley church should have a steeple to it. The chaplain tells everybody that he made a very good end, and never speaks of him without tears. He was buried, according to his own directions, among the family of the Coverleys, on the left hand of his father Sir Arthur. The coffin was carried by six of his tenants, and the pall held up by six of the quorum. The whole parish followed the corpse with heavy hearts and in their mourning suits, the men in frieze and the women in riding-hoods. Captain Sentry, my master's nephew, has taken possession of the Hall-house and the whole estate. When my old master saw him a little before his death, he shook him by the hand, and wished him joy of the estate which was falling to him, desiring him only to make a good use of it, and to pay the several legacies and the gifts of charity which he told him he had left as quit-rents upon the estate. The Captain truly seems a courteous man, though he says but little. He makes much of those whom my master loved, and shows great kindness to the old house dog that you know my poor master was so fond of. It would have gone to your heart to have heard the moans the dumb creature made on the day of my master's death. He has never enjoyed himself since; no more has any of us. It was the melancholiest day for the poor people that ever happened in Worcestershire. This being all from,

'Honoured Sir,

'Your most sorrowful servant,

'EDWARD BISCUIT.'

'P.S. My master desired, some weeks before he died, that a book, which comes up to you by the carrier, should be given to Sir Andrew Freeport in his name.'

'This letter, notwithstanding the poor butler's manner of writing it, gave us such an idea of our good old friend, that upon the reading of it there was not a dry eye in the Club. Sir Andrew, opening the book, found it to be a collection of acts of parliament. There was in particular the Act of Uniformity, with some passages in it marked by Sir Roger's own hand. Sir Andrew found that they related to two or three points which he had disputed with Sir Roger the last time he appeared at the Club. Sir Andrew, who would have been merry at such an incident on another occasion, at the sight of the old man's handwriting burst into tears, and put the book into his pocket. Captain Sentry informs me that the knight had left rings and mourning for every one in the Club."

CURIOSITIES OF BRITISH NATURAL HISTORY.

ANTS.

[Continued from p. 483.]

But the workers have other duties. From time to time the females deposit their eggs; these which are so minute as scarcely to be perceptible to the naked eye, are moistened by the workers, a plan which seems necessary to their development, and laid in heaps in separate apartments, being frequently moved from one to another, as they require a warmer, cooler, drier or moister atmosphere. In a few days the young grubs or larvæ are disclosed. These have to be fed, requiring the more the more they advance in growth; they have to be carried from apartment to apartment as the need may be, in the bright sunny morning to the range of cells at the upper part of the nest, and before evening to those in the earth; and when it is considered that they often amount to seven or eight thousand, we may easily conceive the scene of activity and toil both within the nest and without. A shower, a cloud, the slightest change in the temperature of the air, produce an immediate bustle. The devotion, indeed, of the workers to the helpless larvæ is extreme; in their care they spare no labour, in their defence they sacrifice their own lives before they abandon their charge. When fully grown, the larvæ of most species surround themselves with a silken cocoon and pass into the pupa state; with the exception of food they still require the same unremitting attention; and this too while other eggs are ready for their care and fresh broods of larvæ demanding their services. It would not do for the ant to be a sluggard. During all this time the nest has to be kept clean and in thorough repair, fresh additions have to be made, and food has to be found and brought in.

When the pupa is ready to commence a new existence, the aid of the workers is again in requisition. Guided by unerring instinct, they know the precise moment when the insect inclosed in its shroud requires liberation; for this too is one of their duties. Three or four mount upon one cocoon, and gradually and carefully open the silken envelope where the head lies, and gently extract the prisoner. It is still enveloped in a thin pellicle; this they cautiously strip off, clearing the wings and legs of the males and females, or the legs only of the workers. The new born brood is still attended to and fed, and conducted through the mazes of the nest, till the workers acquire strength and intelligence. The males and females are attended and caressed to the last moment of their taking wing, and even then parted from with apparent unwillingness. Where a female founds a colony, her duties are onerous in the extreme, for unless she attract a few stray workers to assist her, she has to attend to her first brood of young herself; these it would appear are workers and destined to take the burden and toil off her hands for the future.

The operations of ants prove that these insects are capable of communicating with each other, of explaining their wants to each other, and of imparting information. They are ever using their antennæ, touching each other with them, in various ways, and appear thus to have a certain set of signals, universally understood by the species. They exhibit great attention and sympathy towards the wounded of their own colony, assist each other in difficulties, or in carrying or dragging heavy burdens, and in a striking manner demonstrate feelings of pleasure on meeting their comrades after absence.

The food of ants is very various, and consists alike of animal and vegetable substances, to saccharine matters, ripe fruits, as plums, &c., they are extremely

partial; they do not hoard up grain for winter use, as has been long believed, for they pass the cold season in a state of torpidity, at least when the temperature is below the freezing-point, and cluster together, but when the temperature is above this point they pursue their usual avocations. But though ants do not form magazines, they act in a still more extraordinary manner, which, were not the facts well established, might stagger the most credulous. It is well known that a sweet or saccharine juice exudes from the bodies of the aphides, or plant-lice, and of this sweet exudation the ants are very fond. In fact, as Kirby and Spence say, the aphides are their milch cattle,* which willingly render to them their liquid honey; for the possession of these aphides they contend among themselves and a colony often claims a right to the aphides of a neighbouring plant or tree, and resists the attempt of any other colony to poach on their territories. Sometimes they enclose a group of aphides on a branch in a cell of earth, and so keep them as in a stable or cowhouse as their own exclusive property. The yellow ant is stated to be the most noted for keeping aphides. This ant inhabits fields and pastures, making a mound-like nest often of considerable dimensions. It prefers having its herd of aphides always at hand, and therefore collects in its nest a great number of these insects, of a peculiar kind, which derive nutriment from the roots of grass and other plants. It transports them through subterranean galleries to its nest, and these galleries or hunting-ways are extended as circumstances may require. It would appear that to the aphides and especially their eggs as much attention is paid as to the young ants themselves. Mr. Kirby assures us that he has personally witnessed the solicitude of ants to the eggs of the aphides, which they carry in their mouths, to give them the influence of sun and air, and return with them to the interior of the nest. The object is evidently to forward their development, and bring them as early as possible into prime condition. Huber informs us that in the nest of his yellow ant at the foot of an oak he once found the eggs of the aphis peculiar to that tree (*Aphis Quercus*).

Emigrations of ants from some cause or other, often take place. In our country the fallow ant (*F. rufa*) is the most noted for this procedure, but in the hotter climates armies of nomadic ants traverse whole districts and ravage the land as they proceed. Professor Afzelius, speaking of a species at Sierra Leone, states that they march in columns that exceed all powers of calculation and always pursue a straight course, from which nothing causes them to deviate. If they come to a house or other building, they either storm or undermine it, if a river opposes them, though millions perish in the attempt they endeavour to swim over it.

Wars often take place between colonies of different species, and sometimes between two colonies of the same species. It is generally, however, between ants of different species, one large, the other small, that these battles occur, the larger sort being the aggressors, who however by dint of numbers are not unfrequently overpowered. They are said to engage with great determination. Rival colonies of the fallow ant (*F. rufa*) occasionally meet in battle, and Huber details the strife as one of determined obstinacy on both sides, the fury of the combatants preventing them from paying attention to a human spectator; thousands of champions engage in single combat, thousands rush to the mêlée, every individual knows the combatants on its own side, and the strife rages till night puts an end to it, but early the next morning it is renewed, and often for several days in succession. The prisoners, it would seem, are dragged to the hostile encampment and killed. If no Muse has celebrated the 'Myrmidonomachia,' as Kirby and Spence well term it, nor described in verse the exploits of a mimic Hector, Achilles, or Tydides, it is because valour meets not always with a bard:

> "Vixere fortes ante Agamemnona
> Multi, sed omnes illacrymabiles
> Urgentur ignotique longâ
> Nocte,—carent quia vate sacro."
>
> HORACE.

We shall pass, however, to a more extraordinary procedure exhibited by certain ants than that of merely engaging in battle,—a procedure so strange, that had not Huber, Jurine, Latreille, and Kirby and Spence either witnessed it or had proof positive of the facts, we might treat the whole account with ridicule. There are two species of ants common on the Continent, but which are not found or are very rare in our island; they are called Legionary Ants, one the Rufescent Ant (*F. rufescens*), the other the Sanguineous Ant (*F. sanguinea*), and it is to these that the account relates. The colonies of most ants consist of an assemblage of the same species, but in these instances the general rule is set aside, for the workers or neuters of these ants procure by force auxiliaries or slaves of the same caste as themselves, but of a different species, for the purpose of availing themselves of their labour. The enslaved ants are of two species, a black ant (*F. fusca*) and a mining ant (*F. cunicularia*).

From the form of their jaws, says Latreille, and the accessory parts of their mouth, it is impossible for the rufescent ants either to prepare habitations for their family, to procure food, or to feed them,—and these are the motives which induce them to make slaves. The rufescent ants do not go upon their expeditions, which are kept up for about ten weeks, till the males are ready to emerge into the perfect state; and "it is very remarkable that if any individuals attempt to stray abroad earlier, they are detained by their slaves, who will not suffer them to proceed. A wonderful provision of the Creator to prevent the black colonies from being pillaged, when they contain only a male and female brood, which would be their total destruction, without being any benefit to their assailants, to whom neuters alone are useful."

The time of sallying forth is from two in the afternoon till five, during fine clear weather. The army proceeds in a dense column, which winds through the grass, to the distance of thirty or forty feet from the habitation whence they have issued; they then scatter themselves abroad, exploring the ground with their antennæ, in order to detect the traces of the negro race. The negro village is soon discovered: its inhabitants, aroused to a sense of their danger, rush out to defend the precincts; the battle rages, but the besiegers prevail, pressing onwards they drive the negro population to their village, and enter with them, or make breaches in the walls; the fugitives seek the lowest story; the victory is decided; and now the army in triumph returns laden with spoil, each warrior seizes in its mouth a larva or pupa, and bears it off to slavery.

Their assault upon the habitation of the mining ant, which, when that of the black ant is not near, they resolutely attack, is a more difficult affair: these miners fight with desperation, and dispute every inch of their territory defending their progeny to the last; and when the rufescents retire laden with prey, they harass their rear, and for a considerable distance keep up an incessant skirmish.

The excursions of the sanguinary ants are managed somewhat differently: they sally forth in small bands, which are reinforced from time to time, as necessity

* The ant, says Linnæus, ascends trees that it may milk its cows, the aphides and not kill them.

may require, and are often kept at bay by the resolute negroes, till at length a large column arrives to their support; frequent skirmishes precede a general battle, the negroes forming a body to receive the assault. The combat is often for a long time dubious: at last, repulsed on every side, the black population retreats, and endeavours to carry off the pupæ, which they have previously heaped together: the assailants pursue, and force from them their charge, while some enter the village and seize upon the larvæ.

In both instances these nursling captives (for they never take the adults prisoners) are carried home, and trusted to the care of neuters of their own species that have been, like them, captured when young, and are destined in their turn to a similar charge. By the slaves thus obtained, and which are by no means ill-treated, not only the young prisoners of their own race are nursed, but also the young of their masters; they labour in every respect as they would have done in their native colony, excepting that they have to bring food to their masters, and carry them from chamber to chamber; for these warlike ants, as we see among savage tribes, brave as they are in combat, are indolent in the extreme, and moreover, at least in the case of the rufescents, are really dependent upon their slaves. Where the slaves consist of a mixture of black ants and miners, they share the labours and cares of the community between them, and often far exceed in number their masters, whom on some occasions they seem rather to command than obey, even to the extent of manifesting anger to any that happen to return from a predatory excursion without a captive. The fact is that though captives in the first instance the black ants are really the masters and preservers of the rufescent colony, and looked up to accordingly. For the sake of experiment Huber shut up thirty rufescents with larvæ and pupæ of their own kind, and several negro pupæ in a glazed box, excluding any neuter slaves. Incredible as it may appear, they made no attempt to feed themselves, and though at first they paid some attention to the larvæ, carrying them about, they soon laid them down. Most of them died with hunger in two days, and the few that remained alive appeared very weak and languid. At length, commiserating their condition, Huber admitted a single negro, and this little active slave by itself re-established order, made a cell in the earth, collected the larvæ and placed them in it, assisted the pupæ that were ready to be developed, and preserved the life of the neuter rufescents that still survived. What a contrast between indolence and activity, ignorance and intelligence, does such a scene enforce upon our attention!

With regard to the sanguineous ants, they are much more active than the rufescents—they assist in the indoor labours of the colony, in the collection of saccharine juice from aphides, and in the repairs of the habitation; they hunt for a small species of ant on which they feed, and which they drag for slaughter to the fortress, and they are the first to rouse in defence of the community, having, as we are assured, previously placed their faithful slaves in the lowest chambers of the nest as places of the greatest security.

Such, then, is a sketch of the economy, instincts, and operations of our ordinary British and European ants, which are detailed more at large by W. Gould, Huber, Latreille, and others: in some respects they are more surprising than those of bees or wasps, and demonstrate the energy and elevation of that ruling principle which impels them to acts which seem those of reason, and to operations which one might be pardoned in deeming them incapable of executing, but which they accomplish by perseverance, industry, and orderly co-operation. Of the ants of Asia, Africa and Australia, much remains to be known. Travellers have noticed the general habits and structures of some species, but no Huber has studied their more recondite economy.

RICHBOROUGH AND RECULVER.

[Concluded from p. 487.]

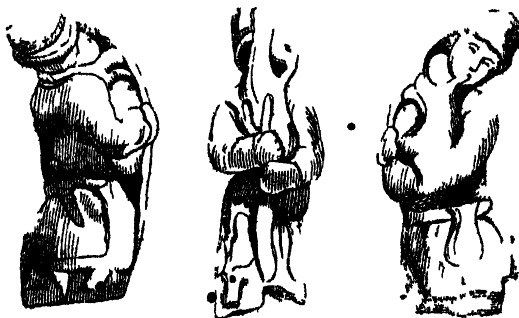
Of the early importance of Richborough we have the most decisive evidence. Bede, eleven hundred years ago, speaks of it as the chief thing of note on the southern coast. Writing of Britain he says, "On the south it has the Belgic Gaul, passing along whose nearest shore there appears the city called Rutubi Portus, the which port is now by the English nation corruptly called Reptacester, the passage of the sea from Gessoriacum, the nearest shore of the nation of the Morini, being fifty miles, or as some write four hundred and fifty furlongs." Camden thus describes the changes in the name of this celebrated place. "On the south side of the mouth of Wantsum (which they imagine has changed its channel), and over against the island, was a city, called by Ptolemy Rhutupiæ, by Tacitus, Portus Trutulensis, for Rhutupensis, if B. Rhenanus's conjecture hold good, by Antoninus Rhutupis Portus, by Ammianus Rhutupiæ statio, by Orosius the port and city of Rhutubus, by the Saxons, according to Bede, Reptacester, and by others Ruptimuth, by Alfred of Beverley, Richberge, and at this day Richborrow: thus has time sported in varying one and the same name." It is unnecessary for us here to enter into the question whether Rhutupiæ was Richborough, or Sandwich or Stonar. The earlier antiquaries, Leland, Lambarde, Camden, decide, as they well might, that the great Roman Castle of Richborough was the key of that haven which Juvenal has celebrated for its oysters (Sat. iv.) and Lucan for its stormy seas (lib. vi.). Our readers, we think, will prefer, to such a dissertation, that most curious description of the place which we find in Leland's Itinerary — a description that has been strangely neglected by most modern topographers. "Ratesburgh, otherwise Richeborow, was, or ever the river of Sture did turn his bottom or old canal within the Isle of Thanet, and by likelihood the main sea came to the very foot of the castle. The main sea is now off of it a mile by reason of woze (ooze) that hath there swollen up. The site of the old town or castle is wonderful fair, upon a hill. The walls, the which remain there yet, be in compass almost as much as the Tower of London. They have been very high, thick, strong, and well embattled. The matter of them is flint, marvellous and long bricks, white and red after the Britons' fashion. The cement was made of sea-sand and small pebble. There is a great likelihood that the goodly hill about the castle, and especially to Sandwich-ward, hath been well inhabited. Corn groweth on the hill in marvellous plenty, and in going to plough there hath, out of mind, been found, and now is, more antiquities of Roman money than in any place else of England. Surely reason speaketh that this should be Rutupinum. For beside that the name somewhat toucheth, the very near passage from Clyves, or Cales, was to Ratesburgh, and now is to Sandwich, the which is about a mile off, though now Sandwich be not celebrated because of Goodwin Sands and the decay of the haven. There is, a good flight shot off from Ratesburgh, towards Sandwich, a great dike, cast in a round compass, as it had been for fence of men of war. The compass of the ground within is not much above an acre, and it is very hollow by casting up the earth. They call the place there Lyteborough. Within the castle is a little parish church of St. Augustine, and an hermitage. I had antiquities of the hermit, the which is an industrious man. Nor far from



[... Reculver.]

he hermitage is a cave where men have sought and digged for treasure. I saw it by candle within, and there were conies (rabbits). It was so straight, that I had no mind to creep far in. In the north side of the castle is a head in the wall, now sore defaced with weather. They call it Queen Bertha Head. Near to that place, hard by the wall, was a pot of Roman money found.

In the bean field within the walls of Richborough there was a space where no beans grew, which we could not approach without trampling down the thick crop. We knew what was the cause of that patch of unfertility. We had learnt from the work of Mr. King, who had derived his information from Mr. Boys, the local historian of Sandwich, that there was, "at the depth of a few feet between the soil and rubbish, a solid regular platform one hundred and forty-four feet in length, and a hundred and four feet in breadth, being a most compact mass of masonry composed of flint stones and strong coarse mortar." This great platform, "as hard and entire in every part as a solid rock," is pronounced by King to have been "the great parade, or Augurale, belonging to the Prætorium, where was the Sacellum for the eagles and ensigns, and where the sacrifices were offered." But upon this platform is placed a second compact mass of masonry, rising nearly five feet above the lower mass, in the form of a cross, very narrow in the longer part, which extends from the south to the north (or, to speak more correctly, from the south-west to the north-east), but in the shorter transverse of the cross, which is forty-six feet in length, having a breadth of twenty-two feet. This cross, according to King, was the site of the Sacellum. Half a century ago was this platform dug about and under, and brass and lead, and broken vessels were found, and a curious little bronze figure of a Roman soldier playing upon the bagpipes. Again has antiquarian curiosity been set to work, and labourers



[Bronze figure found at Richborough.]

are now digging and delving on the edge of the platform, and breaking their tools against the iron concrete. The workmen have found a passage along the south and north sides of the platform, and have penetrated, under the platform, to walls upon which it is supposed to rest, whose foundations are laid twenty-eight feet lower. Some fragments of pottery have been found in this last excavation, and the explorers expect to break through the walls upon which the platform rests, and find a chamber. It may be so. Looking at the greater height of the ground within the walls compared with the height without, we are inclined to believe that this platform, which is five feet in depth, was the open basement of some public building in the Roman times. To what purpose it was applied in the Christian period, whether of Rome or Britain, we think there can be no

sand. The traveller who looked upon it three centuries ago tells us distinctly, 'within the castle is a little parish church of St Augustine, and an hermitage."

When Camden saw the place, nearly a century after Leland, the little parish church was gone He found no hermitage there, and no hermit to show him antiquities. He says, "To teach us that cities die as well as men, it is at this day a corn-field, wherein when the corn is grown up one may observe the draughts of streets crossing one another; for where they have gone the corn is thinner . . Nothing now remains but some ruinous walls of a square tower cemented with a sort of sand extremely binding." He also says that the crossings of the streets are commonly called St Augustine's Cross. There is certainly some confusion in this description of crossings as one cross. To us it appears more than probable that the "little parish church of St. Augustine," which Leland saw, had this cross for its foundation, and that when this church was swept away—when the hermit who dwelt there, and there pursued his solitary worship, fell upon evil times—the cross, with a few crumbling walls, proclaimed where the little parish church had stood and that this was then called St Augustine's Cross The cross is decidedly of a later age than the platform the masonry is far less regular and compact Camden, continuing the history of Richborough after the Romans says, "This Rutupiæ flourished likewise after the coming in of the Saxons, for authors tell us it was the palace of Ethelbert, king of Kent, and Bede honours it with the name of a city" The belief that the palace of Ethelbert was upon this commanding elevation, so strengthened by art, full no doubt of remains of Roman magnificence, the key of the broad river which allowed an ample passage for ships of burthen from the Channel to the estuary of the Thames, is a rational belief But Lambarde says of Richborough, "Whether it were that palace of King Ethelbert from whence he went to entertain Augustine, he that shall advisedly read the twenty-fifth chapter of Beda his first book shall have just cause to doubt; forasmuch as he showeth manifestly that the king came from his palace into the Isle of Thanet to Augustine, and Leland saith that Richborough was then within Thanet, although that since that time the water has changed its old course and shut it clean out of the island' This is a refinement in the old Kentish topographer which will scarcely outweigh the general fitness of Richborough for the palace of the Saxon king. The twenty-fifth chapter of Bede is indeed worth reading "advisedly," but not to settle this minute point of local antiquarianism We have given Bede's description of the Isle of Thanet, in which island, he says, 'landed the servant of our Lord, Augustine, and his companions being as it is reported near forty men' The king, according to Bede's narrative, hearing of their arrival, and the nature of their mission, ordered them to stay in the island, where they should be furnished with all necessaries Some days after, the king came into the island, and, sitting in the open air ordered Augustine and his companions to be brought into his presence For he had taken precaution that they should not come to him in any house, according to the ancient superstition, lest, if they had any magical arts, they might at their coming impose upon and get the better of him But they came furnished with divine virtue, not with diabolical, bearing a silver cross for their banner, and the image of our Lord and Saviour painted on a board, and, singing the Litany, offered up their prayers to the Lord for their own, and the eternal salvation of those to whom they were come Having, pursuant to the king's commands, after sitting down, preached to him and all his attendants there present the Word of Life, he answered thus 'Your words and promises are very taking, but in regard that they are new and uncertain, I cannot approve of them, forsaking that which I have so long followed with the whole English nation But because you are come from far into my kingdom, and, as I conceive, are desirous to impart to us those things which you believe to be true, and most beneficial, we will not molest you, but rather give you favourable entertainment and take care to supply you with your necessary sustenance, nor do we forbid you by preaching to gain as many as you can to your religion.' Accordingly he gave them a dwelling-place in the city of Canterbury, which was the metropolis of all his dominions, and, pursuant to his promise, besides allowing them their diet, permitted them to preach" This memorable transaction, told with such touching simplicity a little more than a century after its occurrence, by the illustrious monk of Jarrow, imparts a far deeper interest to this locality than its Roman memorials.

John Twyne, a celebrated antiquarian who lived in the sixteenth century, says, "There be right credible persons yet living that have often seen not only small boats, but vessels of good burden to pass to and fro upon the Wantsum, where now the water especially towards the west, is clean excluded, and there be apparent marks that Sarr, where they now go over, was 'a proper haven.' Those who have traversed the low country which lies between Reculver and Sandwich—a task not very easily to be accomplished unless the pedestrian can leap the broad ditches which drain the marsh—will readily comprehend how in the course of eighteen centuries, the great estuary may have dwindled into a petty rill There is nothing in the nature of the country to prevent one believing that a large arm of the sea cut off the Isle of Thanet from the mainland of Kent, and that this channel, in the time of the Romans, formed the readiest passage from the coast of Gaul to London The late Mr John Rickman has well described the course of communication between the Continent and Britain —"The Roman roads in Kent deserve notice as having been planned with an intention of greater scope than (within my knowledge) has been ascribed to them The nearest and middle harbour of access from Gaul was evidently Dover, but whenever the wind was unfavourable for a direct passage further resource became desirable, and from Lemanis (Lymne, near Hythe) and Ritupæ (Richborough, near Sandwich) branch roads were made, joining the Dover road at Canterbury, so that a dispatch-boat, by sailing from the windward port, or steering for the leeward of these three ports, could seldom fail of a ready passage to or from the Continent, and especially it is remarkable that the prevailing south-west wind (with this advantage) permitted a direct passage from Gessoriacum or Itius (Boulogne or Witsand) to Ritupæ, in effect to London, the Wantsum channel then and long after existing within the Isle of Thanet to Regulbium (Reculver) on the Thames, being that by which early navigation was sheltered in its access to the British metropolis Indeed the first paragraph of the Itinerary of Antoninus gives the reputed distance from Gessoriacum to Ritupæ, as if more important or more in use than the shorter passage to Dover' ('Archæologia,' vol xxviii.) With this explanation we can comprehend the advantage of the Roman position at Reculver. Through this broad channel of the Wantsum the Roman vessels from Boulogne sailed direct into the Thames, without going round the North Foreland, and the entrance to the estuary was defended by the great Castle of Richborough at the one end, and by the lesser Castle of Reculver at the other' The Roman remains still existing at Reculver are less interesting than those at Richborough, chiefly because they are of less magni-

tude and are more dilapidated. Very close to the ruins of the antient church, whose spires were once held in such reverence that ships entering the Thames were wont to lower their top-sails as they passed, is an area, now partly under the plough and partly a kitchen garden. It is somewhat elevated above the surrounding fields; and, descending a little distance to the west of the ruined church, we are under the Roman wall, which still stands up on the western and southern sides with its layers of flat stone of concrete, defying the dripping rain and the insidious ivy. The castle stood upon a natural rising ground, beneath which still flows the thread-like stream of the river Stour or Wantsum. Although it was once the key of the northern mouth of the great estuary, it did not overhang the sea on the northern cliff, as the old church ruin now hangs. When the legions were here encamped, it stood far away from the dashing of the northern tide, which for many generations has been here invading the land with an irresistible power. Century after century has the wave been gnawing at this cliff; and, as successive portions have fallen, the bare sides have presented human bones, and coins, and fragments of pottery, and tessellated pavements, which told that man had been here, with his comforts and luxuries around him, long before Ethelbert was laid beneath the floor of the Saxon church, upon whose ruins the sister spires of the Norman rose, themselves to be a ruin, now preserved only as a sea-mark. Reculver is a memorable example of the changes produced in the short period of three centuries. Leland's description of the place is scarcely credible to those who have stood beneath these spires, on the very margin of the sea, and have looked over the low ruined wall of the once splendid choir, upon the fishing-boats rocking in the tide beneath:—"Reculver is now scarce half a mile from the shore." In another place—"Reculver standeth within a quarter of a mile or a little more from the sea-side. The town at this time is but village-like; sometime where as the parish church is now was a fair and a great abbey, and Brightwald, Archbishop of Canterbury, was of that house. The old building of the church of the Abbey remaineth, having two goodly spiring steeples. In the entering of the choir is one of the fairest and the most ancient cross that ever I saw, nine feet, as I guess, in height: it standeth like a fair column." Long ago has the cross perished, with its curiously wrought carvings and its painted images; and so has perished the "very ancient book of the Evangeles," which Leland also describes. The Romans have left more durable traces of their existence at Reculver than the ministers of religion, who here, for centuries, had sung the daily praises of Him who delivereth out of their distress those "that go down to the sea in ships, and occupy their business in great waters." The change in names of places sometimes tells the story of their material changes. The Regulbium of the Romans became the Raculfcester of the Saxons, *cester* indicating a camp; that name changes when the camp has perished, and the great abbey is flourishing, to Raculminster; the camp and the abbey have both perished, and we have come back to the Latin Regulbium, in its Anglicised form of Reculver. Some fiercer destruction even than that which swept away the abbey probably fell upon the Roman city. Gibson, speaking of the coins and jewellery which have been found at various times at Reculver, says, "These they find here in such great quantities that we must needs conclude it to have been a place heretofore of great extent, and very populous, and that it has one time or other underwent some great devastation, either by war or fire, or both. I think I may be confident of the latter, there being many patterns found of metals run together." The antiquities of Regulbium are fully described in the elegant Latin treatise of Dr. Battely, 'Antiquitates Rutupinæ,' 1711.

WOOL-BEARING ANIMALS OF SOUTH AMERICA.

There are in South America four kinds of sheep—or of animals somewhat midway between the sheep and the goat—which seem likely, when the commercial intercourse between England and the South American States shall have become more extensively developed, to exert an important influence on English manufactures, especially in the hat, woollen, and stuff trades. These are the *Llama*, the *Alpaca*, the *Guanaco*, and the *Vicuña*. Dr. Hamilton has recently published an Essay on this subject, from which, and from one or two other sources, we will collect a few interesting details.

The South Americans possess the common Spanish sheep, which were introduced there after the conquest by the Spaniards, which have multiplied to so great a degree that they may be purchased in the interior at the low price of one dollar each. These animals, however, present no very remarkable features, and are distinct from the four kinds which belong especially to these regions. The *Vicuña* and the *Guanaco* exist only in the wild state, except when taken prisoners; but the *Llama* and the *Alpaca* are seen domesticated in Peru. The four may therefore be described under two headings:—

Vicuña and Guanaco.—The Vicuña is a handsome and delicate little animal, with a large, prominent, glistening eye, which has a peculiar and expressive softness. When running with great speed, its neck, which is long and slender, is carried in a curved position, almost resembling the letter S. These creatures are exceedingly difficult to capture without having recourse to artifice. They are seen in small bands of a dozen or more, chiefly in the uninhabited regions of the Andes, where vegetation is hardly sufficient to afford them a scanty subsistence. While roaming over the bleak Cordillera, the Vicuña is ever on the watch against danger; for travellers, when entering a ravine or turning round the shoulder of a mountain, frequently see the Vicuña peep round a rock, or look at them from an eminence, when, a signal being given by a kind of shrill cry or whistle, a whole herd of Vicuñas is presently seen scampering away in the distance.

The Guanaco haunts the same secluded tracks in Peru as the Vicuña, but does not mingle with them. The former is a much larger and more powerful animal, and is found on the high land throughout nearly fifty degrees of latitude. The Guanaco weighs on an average about two hundred pounds. It is much more easily caught or run down than the Vicuña, though extremely shy and sensitive on the approach of danger, emitting a sound somewhat like the neigh of a horse, which serves as a warning to its companions. The Vicuña is captured in a very singular manner. A number of Indians form themselves into a *chaco* or hunting-party, together with a pack of small dogs. They choose the proper time of the year, and resort to those dreary regions where the Guanaco and Vicuña are found, taking with them a supply of corn and *chuno* (a nutritive food formed of frozen potatoes in powder, boiled in water with lard and spice). Having fallen in with their game, the Indians spread themselves over a wide extent of ground, accompanied by their dogs, and gradually narrow the circle. At a spot previously fixed on, there is a sort of enclosure made of ropes attached to poles brought for the purpose, fixed in the ground at the necessary distances, and with the ropes at such a height that the pursued Vi-

cuñas cannot pass with their heads elevated. On some occasions, to make the snare more complete, a wide space near the enclosure is surrounded by a number of small red flags, raised a little from the ground and floating in the air. The result is, that by means of the shouts of the Indians and their gradual approach to the enclosure, together with the barking and the movements of the dogs, and the motion of the flags with the wind, the Vicuñas, being naturally timid, are driven into the snare, and, neither jumping over nor stooping under the ropes, are captured, slain, and skinned on the spot.

These two animals, the Guanaco and the Vicuña, are killed chiefly for the sale of their wool. The Guanaco is covered with a short coarse wool of a reddish brown colour on the back and sides, running into stripes towards the belly. This wool is partly exported and partly manufactured for domestic purposes. The wool of the Vicuña is of a brown or fawn colour, and, being exceedingly fine and soft, it is highly valued, and sold at a very high price in Peru, as a material for hats, gloves, "ponchos" or cloaks, and other garments. This kind of wool (with the name generally altered to the forms *vicuña* or *vigonia*) is now imported into England, and is used in hat-making, hosiery, and for other purposes.

Llama and Alpaca.—The Llama and the Alpaca, the other two varieties indigenous to South America, differ in many respects from those hitherto considered.

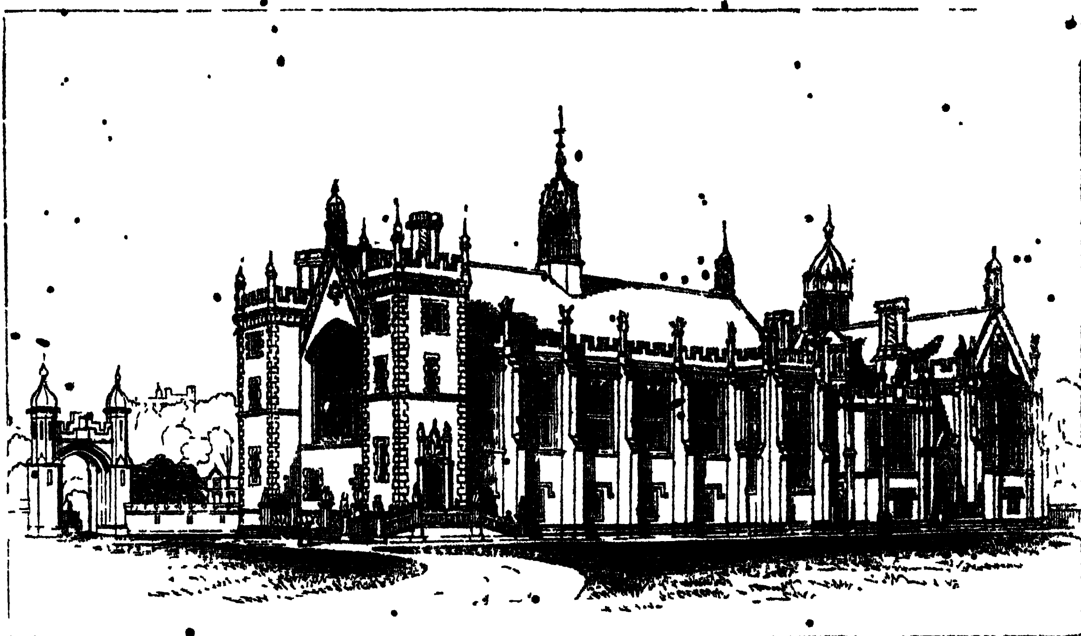
Nine-tenths of the wool of the Alpaca is black, the residue partly white, red, and grizzled. It is of a very long staple, often reaching to twelve inches, and partakes greatly of the character of soft glossy hair. It is not of that felting nature common to other wools, from the great elasticity of its fibres, and requires a very nice preparation to enable it to receive colours. It is extremely soft and silky to the touch, and when dyed it loses nothing of its singular glossiness. The Indians of the mountains manufacture for themselves nearly all their warm clothing from one or other of these animals, and so much of the wool being black, they are able to appear in dresses of a sable hue without the aid of a dyer. From the party-coloured Alpaca wools fancy-pieces are also made by these Indians, whose mode of weaving seems to be very primitive. When Dr. Hamilton was passing through the village of Andamarca, he observed a woman weaving a piece of black cloth; her loom was composed of only four short bits of wood, which were stuck into the ground in the open air before her hut; she was resting on both knees, and stooping at the work, and conveyed the weft from one side of the cloth to the other with her fingers—the web of cloth being about eighteen inches in width.

The Llamas and Alpaca are perhaps yet more valuable to the Peruvians as beasts of burden than as wool-bearing animals. These men are too poor to keep mules, even did the climate admit; but with a flock of Alpacas they can live and carry on a barter-trade with surprising frugality. Tin is brought from the mines of Oruro to Arica, a distance of about a hundred leagues, on the backs of the Alpaca; and during this journey the animal costs its master nothing at all, either for food, or lodging, or tolls. When a Llama or Alpaca is tired on one of these journeys, he gives vent to his feelings by a peculiar cry, which is different from the sound which he utters when teased or irritated. If he is not allowed to rest, or relieved from his load soon after giving this notice of its weariness, he sinks to the earth, all his limbs being bent under his body, and there he dies. No kind treatment can induce him to attempt a renewal of the journey; and the Indians, knowing this singular characteristic of these animals, are disposed at all times to attend to their complaints and to halt when necessary. This solicitude seems to be something more than a mere selfish impulse; for the Peruvian Indian, when not under the debasing influence of ardent spirits, is said to be a mild and kindly being.

The Alpaca is becoming an interesting animal in respect to English manufacture. Its wool is so remarkable, being a jet-black, glossy, silk-like hair, that it is fitted for the production of textile fabrics differing from all others, occupying a medium position between wool and silk. It is now mingled with other materials in such a singular manner, that while a particular dye will affect those, it will leave the Alpaca wool with its original black colour, and thus give rise to great diversity.

When the value of this commodity became appreciated in England, it became an important question whether the animal itself could be reared in this country. From the power possessed by the Alpaca of living on very scanty herbage, it has been proposed to introduce the animal in those districts of Scotland and Ireland where the English sheep cannot flourish. Mr. Walton, a recent writer on this subject, remarks:—"To the tender of an Andes flock, the snow-storm is disarmed of all its terrors; and as the stranger, when naturalized among us, would feed upon herbage left behind by the cattle and sheep which had gone over the ground before him, he would not consequently interfere with the pasturage of our present herds and flocks, nor diminish in the slightest degree the provision of food reserved for them. The income which a farmer would derive from this new breeding stock will be readily calculated when it is taken into account that the South Down fleece seldom weighs more than two pounds, whereas the Alpaca yields from six to eight, and his wool always commands a higher price, besides keeping for seven years if the markets should be low."

The late Duchess of York introduced the Alpaca as a denizen in her pleasure-grounds, as did likewise the late Countess of Liverpool. The Earl of Derby, at Knowsley, has a small flock of Alpacas, some of which were born on the estate; and one, a fine male, has wool eighteen or twenty inches in length. At the Glasgow meeting of the British Association in 1840 Mr. Dawson introduced the subject of the Alpaca, and stated the grounds on which its rearing in England may be advocated. Among the matters adduced by Mr. Dawson was the following: that "the Alpaca wool is naturally free from grease, in which respect it differs materially from the sheep, attributable to its not perspiring through the skin, and consequently not requiring the artificial protection of smearing with tar and other substances injurious to the wool as far as the manufacture is concerned; and in shearing, the animal requires no washing preparatory to the operation." Another point, considered not less singular and valuable, is that of their peculiar coat of silky wool proving a complete protection against an atmosphere at all times excessively humid, and against the deluging rain which (among the Andes) continues to fall upwards of four months in the year; thus rendering them well suited to the Grampian and other mountainous districts of Scotland." Lastly, "the animal is not only capable of undergoing great fatigue, but likewise lives on mountain herbage, little better than a kind of withered grass, and, in times of scarcity, has been sustained several days without water, taking only a handful of maize." A few of these animals have been introduced into this country, but at present the attempt can be regarded only as an experiment.



[New Buildings, Lincoln's Inn.]

PUBLIC IMPROVEMENTS, 1843.

In the metropolis the public improvements have been making rapid progress, though many of the more important works are yet uncompleted. Preparations are making for the construction of the new lines of street from the east end of Oxford-street into Holborn; from the east end of Coventry-street to Broad-street, St. Giles's, thence obtaining ready access to the northern suburbs of the town; in the new street opposite Farringdon-street, some houses and shops have been constructed, in a style of street-architecture which, though neither costly nor aiming at great effect, is far from common-place or mean, but no sign as yet appears of proceeding with the opening to the northward of this fine street and much-wanted thoroughfare. In Trafalgar-square the Nelson column has been at length completed; the statue of King George IV. has been placed, and the statue of George III. is about to be removed from Pall-Mall to a corresponding position with it. Of none of these works have we any wish to speak.

The new street leading from the Post-Office to Lothbury is yet far from being completed. Lothbury itself is growing to be a sort of City Pall-Mall in regard to architectural façades: two have lately been erected in the Italian palazzo style, which, though but of very moderate extent, exhibit much elegance of design. The first of them, or that adjoining the church, is a stone front, four windows in breadth, consisting of a rusticated basement floor, with arches and moulded imposts, and over it a principal and second floor, crowned by a cornicione and blocking course. The other building, the Alfred Life Office, which is narrower in frontage, it being only twenty-eight feet, has likewise a basement with arched openings, and two floors above it. Another building, close by, in Moorgate-street, partakes of the same general style and composition. In this street also, at the corner of Basinghall-street, has been erected the New Gresham Hall, by Mr. G. Smith. Its principal front faces Basinghall-street. This elevation is of more than ordinarily noble aspect, and presents a Corinthian order in four engaged columns and two antæ, whose height is thirty-five feet, raised on a stylobate eight feet high, rendering the entire height of the order, including that part, fifty-three feet. Although the columns are unfluted, the entablature is of richer character than usual, particularly the cornice. The absence of windows, too, contributes not a little to classical character. The south elevation, facing Cateaton-street, is of somewhat less pretension. That part of Wellington-street which faces the English Opera-house is now completed by the erection of a new building for the office of the 'Morning Post,' which has a frontage of considerable extent, and whose elevation is of pleasing though sober character, making no other pretensions to design than what it derives from the dressings of the windows. Contiguous to this, and partaking of the same character in regard to materials, viz. red brick, with imitation stone-dressings, is the western entrance to a Passage to be named the Exeter 'Change (it being on the estate of the Marquis of Exeter). This avenue of shops runs obliquely into Catherine-street. This Passage will be coved and groined, and lighted from above; and it is proposed to introduce, though sparingly, some fresco decorations on the ceiling and upper parts of the walls; nor can a more suitable situation be found for affording the public a specimen of any polychromic embellishment than a thoroughfare, where it will be protected from the weather.

The wings of the British Museum have been for some years in progress; they are now completed, and occupied. On the internal arrangements too much praise can hardly be bestowed; but of the general exterior nothing can well be said until the front, yet in progress, is finished. Towards the New Houses of Parliament, now officially styled the Palace of Westminster, a very unusual degree of interest has been excited; much of it, however, belongs rather to the proposed embellishments than to the structure itself. The exhibition of the Cartoons contributed not a little to give vogue to whatever was connected with the building. Many years must yet elapse before even the mere shell of the whole structure will be completed. Extensive as it is, what is already done is but a comparatively small portion—little more, in fact, than the exterior of the east side, or the river front,

and that of the south front, at whose western angle the Victoria Tower has been begun. It has also been proposed to continue the building to Bridge-street, inclosing Old Palace Yard, to remodel Westminster Bridge, and to construct a terrace, by means of embankments on the opposite side of the river, from Vauxhall Bridge to London Bridge.

The Royal Exchange is the first building which claims notice as a public work of more than ordinary consequence. The exterior may be considered as now nearly completed, the last stone of the tower having been placed at the end of October; and the scaffolding is nearly all removed. In regard to the Exchange portico very considerable improvement has been made upon the first design, and projection has been given to it. Its pediment will now be enriched with eleven figures in full relievo, which are being sculptured by Westmacott. The inner quadrangle has been much altered from the original design; the colonnades being now converted into arcades, with attached columns (Doric) against their piers, whereby the lower part has gained considerably in the expression of solidity, and the whole is rendered more uniform and compact.

The new structure in Lincoln's Inn now in progress, under Mr. Hardwick, will not only make a great addition to the buildings of this Inn of Court, but be an important architectural feature, and a very conspicuous object from Lincoln's-Inn-Fields, towards which the whole of its west side will be fully exposed to view. It comprises not only a dining-hall upon an extensive scale, but a spacious library, and benchers'-room or drawing-room. The style adopted is that of the early part of the sixteenth century, or the reign of Henry VIII. The dining-hall will be one hundred and twenty-four feet long, forty-five wide, and sixty-four high. One characteristic feature of it will be an open timber roof of oak; and all the windows will contain a great deal of stained glass emblazoned with the arms of members of the Inn. The exterior of the building is of red brick and stone, with an intermixture of darker-coloured bricks. Architectural effect will be extended both by the terraces connecting the structure itself with the gardens and by the adjoining entrance from Lincoln's-Inn-Fields.

The Law has latterly become the great patron of Architecture; the Temple Church and the above building are eminent instances, but architectural improvement has found its way even into Staples Inn, whose situation would be hardly known were it not a thoroughfare from Holborn into Southampton-buildings. The architects are Messrs. Wigg and Pownall, and the building is to be used as offices for the Taxing Masters in Chancery. The style of architecture adopted is Elizabethan; and of that style the grosser extravagances are here avoided, and some of its best characteristics preserved. The frontispiece arched entrances, and the semicircular oriels over them, are exceedingly good and produce much effect. The street is four or five feet higher than the level of the garden-court of the Inn, and formerly there was a flight of steps leading down immediately from the street, but advantage has been taken of this inequality of level to carry a terrace along the front of the new building, placing the flight of steps at the other end of it.

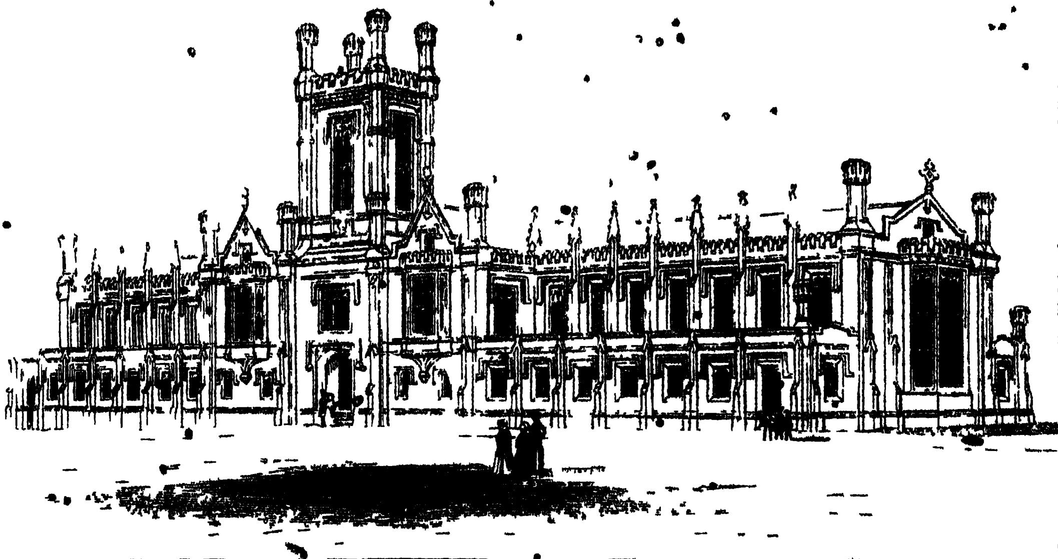


[London Terminus of the South-Eastern, Brighton, and Croydon Railway.]

Of the Brighton, Croydon, and Dover Joint Railway Terminus at London Bridge, the extensive works have been carried on with such diligence as to be now approaching towards completion. The area occupied by them, exclusive of the original Greenwich station, to which they adjoin on the south, comprises nearly three acres. The iron roofs covering the whole of the space appropriated for the arrival and departure of passengers and carriages extend over a surface of more than an acre and a quarter, and exhibit a combination of superior scientific skill and correct taste, highly creditable to both the engineer and the architect, Mr. H. Roberts, employed upon them.

What, however, most attracts notice, is the general architectural façade of the Terminus, which, though of but moderate height in itself, is rendered conspicuous both by its situation and by the campanile tower, which, besides being a marked object in itself, contrasts forcibly and favourably with the lower horizontal mass. Our view exhibits only the portion now executed, viz., the south wing of the principal building, with the campanile and the large archway forming the entrance for

private carriages to be conveyed by the trains. This line of front will consist of five compartments, three of three windows each in breadth, and a smaller one at each end only a single window in breadth. Accordingly, the view shows one-half exclusive of the centre window, or five windows out of eleven on the upper floor, and one of three doors of the centre compartment—the only circumstance which distinguishes that division of the façade. The ground-floor of the centre building is appropriated to the general booking-offices, and the upper one, which is approached by a stone staircase in the tower, to rooms (including an elegant and spacious one in the rear) chiefly for the half-yearly meetings of the three Companies.



[Cheltenham Proprietary College.]

Of public buildings in the country, the Cheltenham Proprietary College, commenced in August, 1842, and opened on the 22nd of June, 1843, is by Mr. James Wilson of Bath. The building is of stone from Dodswell hill near Cheltenham, and stands with its west or principal front (shown in the view) facing the Bath road. This façade is 240 feet in length, nearly of the same extent as that of the Richmond Theological Institution described and represented in our last volume, being only eight feet less; but it is ninety feet in depth, or twenty-five feet more than the other. There is also a general resemblance between the two structures as to architectural style, but with considerable differences in regard to composition and design. The arrangement of the windows is here the reverse of that in the other building, for the larger and more decorated windows are placed above the smaller ones. The tower in the centre of the front rises considerably above the general mass, and is eighty feet in height, exclusively of the pinnacles at its angles, which increase it to ninety seven feet. In this tower is the principal entrance, a large and handsome doorway, but the window over it is not of that importance which could be wished: it is the smallest of all the windows on that floor, and shows itself still more disadvantageously by coming in between the two oriels, and also beneath the loftier window in the upper part of the tower. The interior is well designed for its purposes, and the cost, including heating apparatus, is rather more than 8000*l*.

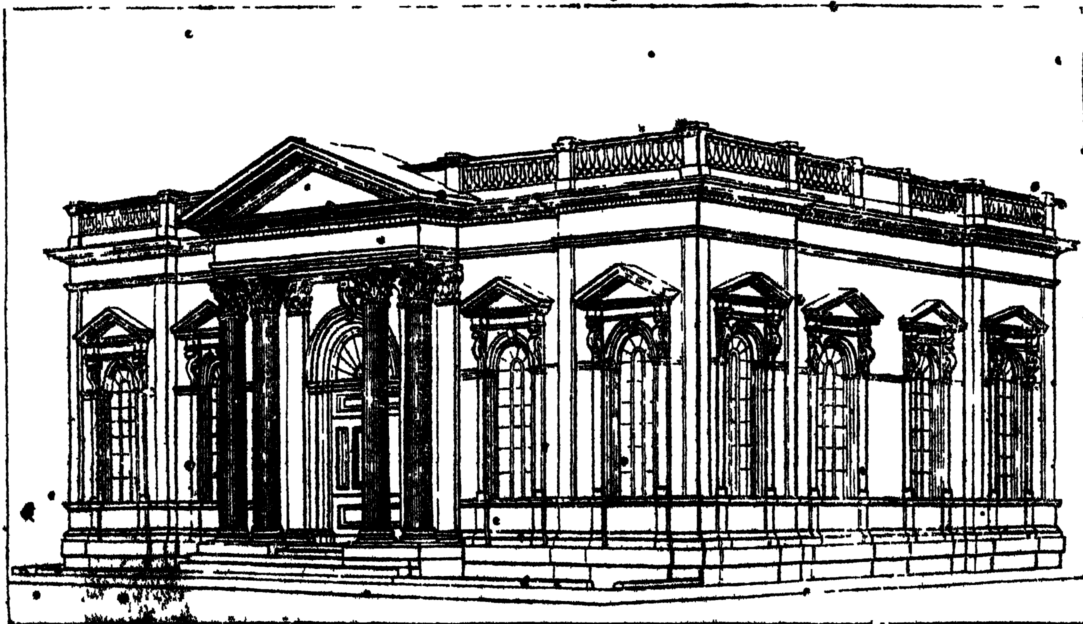
At Leeds, Mr. Marshall's Flax-mill is in the Egyptian style of architecture. The architect is Mr. Jas. Combe of Leeds. The mill forms a parallelogram in plan of four hundred feet from east to west, by two hundred and twenty from north to south. The other sides being shut out from view, it is only the east end which, together with the other building at its north angle, is treated architecturally, and the two united form a frontage of three hundred and forty feet. This façade is entirely of stone, and the mill portion of it forms a long but low range, not exceeding thirty feet in height, which has eighteen columns, with the intercolumnar screens peculiar to the Egyptian style between them reaching midway of the columns, the spaces above them being glazed to serve as windows. The office, which is about six feet higher, is finished in a superior manner to the other, it being fully enriched, and all the details and ornaments accurately copied from indubitable authorities partly furnished by Mr. Bonomi, an architect, who has visited Egypt. Its façade is modelled after that of an Egyptian temple, presenting a recessed portico of six columns, enclosed below by intercolumnar screens, and a doorway in the middle one. Of the interior an account is given in the Supplement which follows.

The Glasgow Corn-Exchange, although of but moderate size, may be considered an important addition to the architecture of Glasgow, on account of the finished elegance which pervades its design. The architects were Messrs. Brown and Carrick, of Glasgow, and the building was begun in October, 1841, and opened for business in the November of the following year. Standing at the angle of Hope and Wellington streets it presents both those elevations to view at the same time when looked at in that direction, and the principal one, or that facing the first-mentioned street, is eighty-four feet, the other sixty feet, in length, and the height to the top of the balustrade thirty-eight feet. Both these fronts, including all their ornamental details, are of polished freestone, and the other walls are also of stone; so that the building has an appearance of solidity and careful execution. The interior consists of a single hall, eighty by fifty-seven feet, and twenty-one feet to the top of the cornice and level of the ceiling at the sides, but this last is carried up much higher over the centre and larger portion of the room, where the height is increased to thirty-four feet,

and the light admitted by a lantern of handsome architectural design. There is cellarage beneath the building capable of storing eight hundred tons of grain.

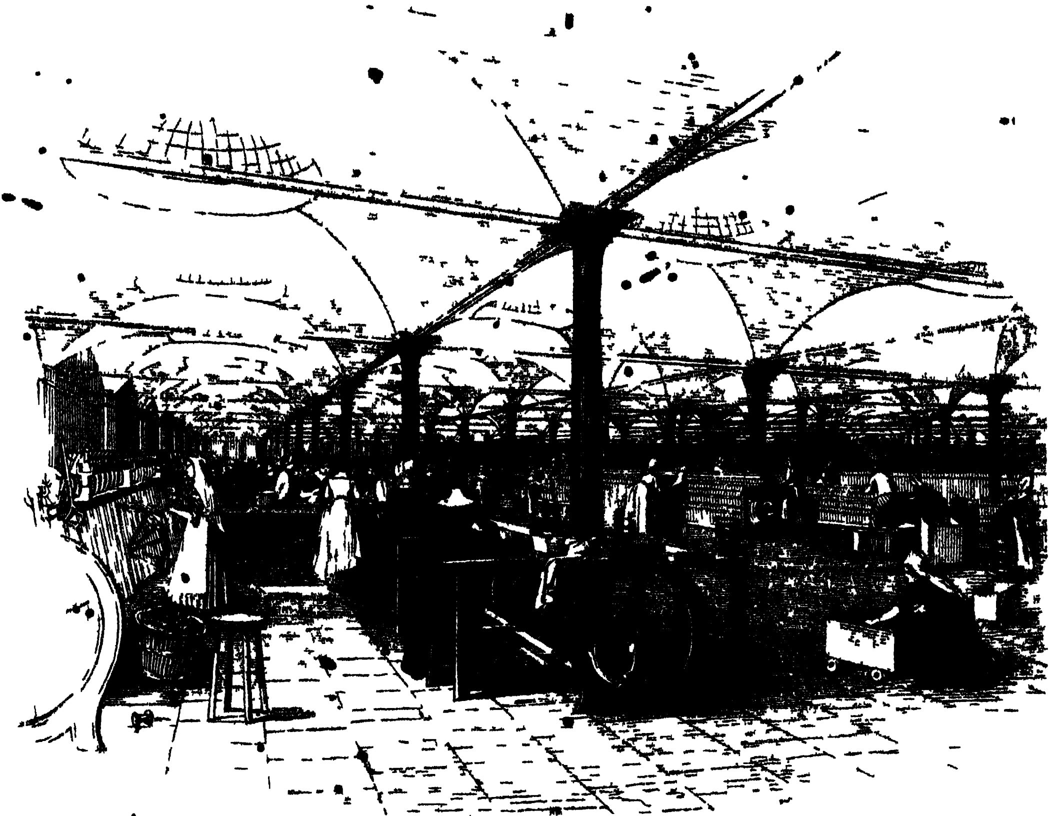
Of church architecture we have but little to record. Twenty churches have been completed, and thirteen are in progress, according to the Report of the Church Building Commissioners. Of some we have spoken, but of most we have no particulars. Within the few last years attention has been bestowed more especially upon ecclesiastical design and arrangement in the interior of churches. The use of stained glass is now becoming comparatively common. A far better character of design, too, has been adopted for it than prevailed in previous specimens of that art in modern times, figure-subjects—too much akin to pictures—having given way to diapered patterns, which, when well managed in combination of colours, are effective and ornamental, mellowing the light. The church at Herne Hill, Camberwell, by Mr. Alexander, will be so decorated, to a very great extent, as no fewer than twenty-five windows will be filled with stained glass. The building, itself, which is in the early Perpendicular stylo, is of brick faced with Sneaton stone, and with freestone quoins and other dressings. The spire and the tower on which it is raised form the chief part of the west front, and from its height, 115 feet, it will be a very conspicuous object for a considerable distance. The nave has a clerestory, and a timber ceiled roof (divided into large panels or compartments, intended to be decorated with painting), with cross-beams (at intervals corresponding with the pillars and the heads of the arches), the space above which and the inclined sides of the ceiling will be wrought in open-work arches; thus presenting a series of low ornamental gables. The pavement of the centre of the nave, and also of the chancel, will be laid in encaustic tiles. The sloping roof of the aisles will be panelled and decorated similarly to the ceiling of the roof; and the organ will be placed in a recess over the porch, by which means the western window of the tower will come into view.

The Chapel and buildings of the new Cemetery at Cambridge, though upon a small scale, are of beautifully studied design and choice execution. The ground, which consists of about three acres, situated a little to the north of the town, on the Histon road, was laid out by Mr. Loudon, and the buildings have been designed and erected by Mr. E. B. Lamb. The entrance-lodge and gates offer a remarkably pleasing and characteristic composition in the Tudor style, executed in brick, with Caen stone dressings, with this peculiarity, that the general surface is of white brick, forming the ground of an ornamental interlacing pattern in red brick; and the roof is covered with round-end plain tiles of a whitish grey hue. This entrance is at the western extremity of the cemetery, and consists of two gates with the lodge immediately between them. In a direct line with the entrance and in the centre of the ground is the chapel, standing east and west, and raised somewhat above the general level on a low terrace. The plan is rendered slightly cruciform by two recesses within, on its north and south sides, and the exterior elevations of these parts resemble that of the east end, all three of them presenting a single window of three lights beneath a lofty pitched gable; and though they are similar in dimensions and general design, the heads of these windows are filled in with tracery of different patterns. The west elevation has a recessed porch which rises up considerably into the gable, and has a small circular window over it. Over the door within the porch (which is of oak, and, instead of being panelled, is ornamented with iron scroll-work) the head of the inner arch is filled in with rich flowing tracery, for a window. The walls are built of rubble, but all the quoins, copings, mouldings, windows, &c. are worked in Caen stone, and the roof is covered with ornamental tiles, and crested with ridge tiles. The roof is supported by four stone arches, the space or spandrels above which are filled in with perforated tracery; a richly-carved oak screen divides off the space at the east end, intended to serve as a registry, and the two other recesses north and south, which are raised a step above the pavement, contain oak seats with carved finials. The pulpit also is of oak, with carved open panels, the pavement of encaustic tiles forming a rich pattern and border, and so disposed that the pattern is diversified by larger compartments in the centre and angles. The windows will be filled with stained glass of a diapered pattern.



[Glasgow Corn Exchange.]

A DAY AT A LEEDS FLAX-MILL.



[Interior of Marshall's Flax Mill.]

Every one knows of what materials *cotton*, *silk*, and *woollen* goods are made, but the same cannot perhaps be said respecting *linen*, because the latter, unlike the three former, is not expressed by the same term that expresses the raw material from which it is made. In the Latin language the name for flax is 'linum,' and in all the languages of the south of Europe, derived from the Latin, the name is somewhat analogous, such as 'lin,' 'len,' 'lino;' but in the north the name is totally different, being presented under the three forms 'flax,' 'flachs,' and 'vlasch,' in English, German, and Dutch. It will be seen, therefore, that our common name for the raw material is derived from the Gothic name for flax, while that for the manufactured goods is derived from the Latin name for flax. This may appear a trifling matter; but we believe it has been the means of preventing many persons from being able to answer the question "From what is linen made?"

A description of one of the immense flax factories of modern times will give us an opportunity at the same time to glance at the arrangements by which flax is worked up into linen and other woven fabrics.* The linen-manufacture, considered as distinct from flax-spinning, is an example rather of domestic than of factory operations, and therefore we may not have a better opportunity than the present to notice it. As the flax, too, is partially prepared before it reaches the flax-mill, it may be well to speak briefly of the flax-growers and their operations, in short to trace the history of a piece of linen cloth from the seed to the loom.

The flax-plant has a green stem from a foot and a half to two feet high, and the flaxen fibres are derived from a kind of inner bark to this stem. It is cultivated more or less in a great number of countries, but Holland and the district around Riga are those whence we obtain our chief supply. The soil (a rich loam) being carefully prepared, the lin-seed (that is, the seed of the 'linum,' or flax-plant) is thrown on broadcast, about a hundred and seventy pounds to the acre, and slightly covered with earth by a harrow or hurdle. The surface is next rolled, trodden, or pressed flat and smooth, and in a short time the plants appear above the surface. As soon as the flax is a few inches high, the weeds are carefully taken out by women and children, and when the flax begins to get yellow at the bottom of the stem, it is ripe for plucking, if fine fibres for lace and cambric be required, but is too young if the seed be required to be preserved; and the cultivator therefore decides on the proper time for getting in his crop. The pulling is done carefully by small handfuls at a time, in fine weather, and the handfuls are laid upon the ground to dry, two and two, obliquely across each other. Soon after this they are collected in larger bundles, and placed with the root-end on the ground, the bundles being slightly tied near the seed-end, and the other end being spread open for the access of air. When sufficiently dry, they are tied more firmly in the middle, and placed in long narrow stacks on the ground, eight or nine feet high and twenty or thirty long. Several of these stacks are built up in the same field, and thatched at the top.

When the flax has dried in the stacks, the seeds are

covered, either for planting, or for the various preparations of linseed: this is done either by beating the upper end of each plant with a kind of bat, or by drawing the plant through a sort of comb which will not admit the capsule. The plants are then, either in that or the following season *steeped*, a very important operation, the object of which is to separate the bark from the woody part of the stem, by dissolving a glutinous matter which had caused it to adhere, and also by destroying some minute vessels which are interwoven with the longitudinal fibres, and keep them together in a kind of web. Near Courtrai in Flanders the steeping is effected better than anywhere else, and is thus managed:—The bundles of flax are placed alternately with the seed-end of the one to the root-end of the other, as many being tied together as will make a thick bundle about a foot in diameter. A strong oak frame-box, measuring about ten feet square by four deep, is filled with these bundles, set upright and closely packed. The skeleton box is then immersed in the river Lys, boards loaded with stones being placed upon the flax till the whole is sunk a little under the surface of the water. The bottom does not reach the ground, so that the water flows over and under it. There are posts driven into the river to keep the box in its place, and each flax-steeper (for this is a separate trade at Courtrai) has a certain space of river-bank to himself. As soon as the fibres are found to separate readily from the wood, the flax is taken out of the water, the bundles untied, and the flax *grassed*, that is, spread evenly in rows on a plot of smooth grass which has been mown or fed off. It remains spread out upon the grass for a fortnight in fine weather, till the woody part becomes brittle, and some of the finest fibres separate from it of their own accord. It is taken up, tied up when quite dry into bundles, and carried into the barn, there to remain till ready for the operation of *breaking*. This steeping or '*water-retting*' is sometimes effected in stagnant pools, and there is also a kind of retting sometimes adopted called *dew retting*, which consists in exposing the stalks to the action of dew on the grass for a considerable period.

The flax grown in England and Ireland has been hitherto much inferior to Dutch and Belgian flax; but attempts are now being made in Ireland which require a slight notice here. In the spring of the year 1841 a Society was formed at Belfast (the head-quarters of the Irish linen trade) for "the improvement of the growth and preparation of flax in Ireland." It was supported by many noblemen and gentlemen in the north of Ireland, who subscribed funds for working out the objects of the Society. In a pamphlet detailing the proceedings at the first meeting of the Society, there is proof abundant adduced to show that the proper mode of cultivating flax is not understood by the Irish farmers. "In the most fertile districts of the country," it is stated, "the culture of flax is totally unknown, in others the crop is neglected, in some given up from partial failures, and even when regularly brought into rotation its management is so little comprehended, as to yield little satisfaction to the consumer, and scarce half of those profits to the grower that it might do. The source of failures and reasons for non-accomplishment of this, have now been clearly understood by intelligent parties to be attributable solely to carelessness, such as not properly preparing the ground, weeding, steeping, grassing, and swingling or cleaning the flax; and these being all faults referable to the farmer himself, he willingly finds excuses, blaming season, water, or anything but his own ignorance or indolence, and rests perfectly satisfied that a crop of flax cannot be rendered as profitable [illegible] as on the Continent." As a means of affording practical instruction to the Irish flax-growers, the Society proposed to send intelligent men to Flanders to witness the operations as there conducted, and to bring over one or two experienced foreigners to Ireland as instructors. In the spring of 1842 the first annual meeting of the Society was held, and a detail was there given of the proceedings consequent on the original resolutions. Mr. Skinner, the secretary of the Society, had gone over to Belgium in the autumn of 1841, accompanied by a few intelligent young farmers; and, after witnessing the whole operations connected with the flax culture during a period of several weeks, they had returned to Ireland, to impart to their neighbouring farmers the information which they had gained. M. Demany and Josèphe Quintelier, two Belgians, the former an agriculturist and the latter a labourer, were also invited or engaged by the Society to superintend in person the proceedings of the Irish flax-growers, or at least to offer advice and afford assistance wherever required. Printed directions were also drawn up for the preparation of the soil, the sowing of the seed, the selection of seed for sowing (Riga seed being deemed the best), weeding, pulling, rippling, watering, grassing, milling, and hand-scutching the flax. Some of the flax resulting from these improved methods of proceeding has reached the hands of the Leeds flax spinners, and the quality has been such as to give encouragement for further attempts. We believe that during the present year one of the Flemish flax-growers has been engaged by the agriculturists of Norfolk to impart instruction in this art to the farmers of that county.

We now proceed. The flax—whether grown in Russia, in Holland, in Ireland, or elsewhere—after having been steeped, grassed, and dried, is in a fit state for the separation of the fibre from the woody portion, a process which is called *breaking* or *scutching*. Two plans are adopted according to the extent and importance of the arrangements. In the domestic manufacture, where the flax grower is to a certain extent a flax dresser also, the flax is crushed between wooden bars so as to break the woody portion in many places, without breaking the fibre. The flax is then ready for *scutching*, whereby all the fragments of boon are beaten out, leaving the fibres in a more or less cleansed state. This is effected by holding the flax in a kind of groove, and beating it in every part with a wooden staff or bat. Many machines, of more or less complexity, have been invented for facilitating the process of breaking and scutching, some for use among domestic manufacturers, and others adapted rather for a manufacturer on a large scale. The machine now more commonly employed in the latter case is a kind of mill, having three fluted cylinders, one of which is made to revolve by horse or water power, while the other two are carried round by the first. The flax plants are passed between these cylinders while thus revolving, and the stalk or boon is by this means completely broken without injuring the fibres. The scutching is effected in the same mill by means of four arms projecting from a horizontal axle, arranged so as to strike the boon in a slanting direction, until the bark and other useless parts of the plant are beaten away.

It is in this state, *i.e.*, after the boon has been loosened and removed from the fibre, that the flax is transferred to the *Flax-Mills*, those large establishments of modern times in which the fibres are spun into thread for the seamstress and lace-maker, or into yarn for the weaver. We may now, therefore, introduce the reader to one of these important factories.

Messrs. Marshall, of Leeds, to whose courtesy and kindness we are indebted on the present occasion, have a flax-mill in that town which is among the largest factories in the empire. It gives employment

to no less than twenty-three hundred persons, and in it also is prepared the yarn from which thread is made by seven hundred persons employed in another factory owned by the same firm at Shrewsbury; thus making three thousand operatives engaged in the various stages in the preparation of flax. When it is considered that a girl employed at a spinning-machine of modern times can spin as much yarn as a hundred hand-spinners could at a former period, this large number of operatives will illustrate in a striking degree the vast extension which must have been given to flax-spinning within the last few years. Several causes have led to this; among which is a change in the import duty formerly imposed on flax, while another is the excellence of the yarn spun by the admirable machines now used; and indeed the yarn can be sold cheaper than the inferior yarn of former times. In a Committee of the House of Commons on Manufactures, in 1833, Mr. Marshall stated, in reference to the improvement in the linen trade, "The great improvement has been in the mechanical spinning of the flax, which has enabled our linen manufacturers to extend the trade so much as they have done. Before the flax was spun by machinery, the French and Belgian spinners were so superior to anything that we had in this country or in Ireland, that the linens were a great part of them imported from Flanders or from the north of Europe." It was stated that at that time the firm employed about thirteen hundred hands; but that nevertheless the quantity of flax spun was so large, that this did not comprise above a fourth of the numbers so employed in Leeds. It was also explained, that under the new and extended mode of conducting the flax manufacture, the large firms purchased their raw flax direct from the foreign ports, while manufacturers of smaller capital purchased from intermediate merchants. Of the effects which the use of mill-spun yarn, instead of home-spun, is producing in the linen trade of Ireland, we shall have to speak in a future page.

The flax-mill which we are about to visit is situated in a south-western suburb of Leeds, called Holbeck, on the south of the river Aire. The buildings comprising it are scattered over an area of many acres, and exhibit to view an assemblage of structures of different sizes and ages, resembling a little town which has grown with the growth of its manufactures, not on any very symmetrical plan, but as convenience from time to time suggested. The older portions of the factory present the appearance which is so familiar in respect to factories generally, viz. a broad and lofty front studded with rows of windows to a height of six or seven stories; and the interior, in like manner, presents the customary factory features of long galleries and rooms, filled with machines attended by operatives of both sexes and various ages; with an accompanying noise and bustle, which, though apparently to a stranger indicative of confusion and disorder, are really so only to those who are not familiar with the admirable arrangements and discipline whereby alone a large factory can be conducted.

But the "new mill," a building which has attracted a good deal of notice within the last two years, and of which a description was read before the Institute of Civil Engineers, is too remarkable to be included in a slight notice of the buildings generally: it must occupy a place by itself. It is neither like other factories in the outside nor in the inside, the height nor the depth, the walls nor the roof. We believe that Mr. Smith, of Deanston, who combines so singularly the skill of a mechanician with the skill of an agriculturist, was the first to adopt this style of factory construction; and Messrs. Marshall's is the second, and a much larger and more complete specimen of the same kind. On proceeding down Marshall Street, we first pass a long range of dark brick buildings, forming the main portion of the old mill; and then we come to an open space between the old and new mills, with an arched passage leading from the one to the other. In this opening, or rather somewhat behind it, is situated the tall chimney of the new mill, a chimney having the form and proportions of the oft-described 'Cleopatra's Needle' of Egypt. We next come to a building, not yet entirely finished, which is to form the offices and counting-houses of the factory; exhibiting a front analogous to that of an Egyptian temple, derived from the drawings and designs of Bonomi and David Roberts. Then we arrive at the mill itself, which exhibits on the eastern side a façade one story in height, a range of eighteen windows, very much larger than are customarily used in factories, a range of eighteen pillars or pilasters, and a kind of projecting cornice running along the top; the whole having an Egyptian character in the general appearance and arrangement, and the whole front being formed of stone. The other sides exhibit externally nothing remarkable, if we except the great length.

Let us next visit the interior. Here the eye takes in at a glance an amount of space which, we believe, no room devoted to manufactures anywhere else exhibits. Indeed this is one of the largest rooms in the world. It measures three hundred and ninety-six feet long, by two hundred and sixteen broad, covering nearly two acres of ground. Perhaps these dimensions will not give such a familiar idea of the size of the room as a comparison between it and other well-known buildings; and we have therefore made a few calculations to afford this latter kind of illustration. When we say, then, that this enormous room covers one and a half times as much space as the extreme outer dimensions of the General Post-Office in St. Martin's-le-Grand, five times as much as Westminster Hall, seven times as much as Exeter Hall, nine times as much as the new Town-hall at Birmingham, eleven times as much as Guildhall; and that if the largest four club-houses in London, viz. the Reform, the Carlton, the Travellers', and the Athenæum, were placed side by side, their united length would not equal the length of this room,—its vastness will become in some degree appreciable. It might at first thought seem strange why such an enormous one-storied structure should be built, since a given area of ground would obviously afford more working-room if story upon story were built, as in usual cases. But the advantages resulting from this plan are stated to be "convenience of supervision, facility of access to the machines, the power of sustaining uniformity of temperature and moisture, the absence of currents of air, which are so objectionable in other mills, the simplicity of the driving gear, and the excellent ventilation, which is so desirable for the health of the work-people."

The room presents to view about fifty pillars placed equidistant and supporting the roof. This roof is formed of brick, and consists of sixty-six flattish domes or groined arches, each about thirty-six feet span. In the centre of each arch is a skylight of large dimensions, being thirteen or fourteen feet in diameter, and rising conically to a height of eight or nine feet above the roof, thus presenting on the whole a surface of ten thousand square feet of glazed skylight, by which a very efficient light is admitted to the room. As the room is about twenty feet high, there is a degree of airiness, or freedom in the atmosphere (if we may use such a term), not often observable in factories. Although the machines in the room are very numerous, yet so ample is the space left between the avenues along which they are ranged, that the eye glances along the vista uninterruptedly, there being several parallel

ranges of machines extending the entire length of nearly four hundred feet. The earlier stages of flax-preparation, which are somewhat dusty, are not carried on in this room, the processes being chiefly 'drawing,' 'roving,' 'spinning,' and 'twisting' the flax, all of which require the clean and elegant machinery incident to spinning, and the workpeople employed being almost exclusively females. Each machine has over it a tablet on which entries are from time to time made, specifying the quality of yarn then being made, the quantity, the number of spindles, or other matters of a similar kind.

When we descend beneath this great room, we find a series of vaults and passages, all formed of substantial brickwork, employed chiefly in regulating the warmth and ventilation of the rooms above. There is a steam engine of eight horse-power which forces air through ranges of pipe in two large steam-chests, where it becomes heated, and is from thence conveyed up into the mill. There is also an arrangement of valves and doors by which the air is brought to any desired temperature according to the season or it may have imparted to it any degree of moisture best suited to the preparation of the flax. The ventilation is aided by valvular openings at the summits of the conical skylights. The vaults also contain the shafts for communicating to the room above the motion from a pair of very large steam-engines.

Having gone beneath the giant-room, we may next go above it; and here a stranger is apt to be puzzled in no small degree. To "take a walk in the fields" on the top of a factory seems strange enough; yet such is the impression likely to be made at a first glance. The whole surface is covered with full and luxuriant grass, not artificially smooth like a lawn, but with such slight undulations of level as make the resemblance to a field more striking. If a visitor were to go on the roof before seeing the inside of the building, he would infallibly think that the room had been excavated out of the solid ground; and the sixty or seventy skylights, rising up conically from the grass to a height of two or three feet above his head, induce him to ponder whether any gardening operations are being carried on whether these glass enclosures—a sort of hybrid between cucumber-frames and greenhouses—are the scene of any experimental researches on plants. On looking down one of these skylights, however, the spindles and bobbins are seen working away by thousands; and the inquiry then naturally suggests itself why this form of roof has been adopted The brick arches which form the ceiling of the great room are covered with a layer of rough plaster, then with an impermeable coating of lime and coal-tar, as a kind of asphalte; and in order to prevent the heat of the sun from cracking this composition, a layer of about eight inches of good mould is laid over it, and grass-seed sown therein. During the greater part of the year, the natural state of the ground efficiently protects the roof from the alternations of heat, frost, rain, &c.; while a little watering in the height of summer completes the preservation. The mode of draining this surface of two acres is not the least curious among the features of the place. Every one of the fifty or sixty iron pillars supporting the roof (each one at the intersection of four domes or groined arches) is a hollow tube, down which the rain-water passes to the sewer beneath. The top of each of these tubes, open to the air, is covered with a wire grating which will admit water, but not earth. The slight undulations in the grassy level are made in order that the water may flow towards the gratings, and thereby prevent the settlement of water where, through having no outlet, it would do injury.

When on the roof of the mill, we can see a neat red brick building which forms the *School* belonging to the factory; and as such schools are becoming more and more important in connection with the factory system, we will glance at its arrangements before witnessing the manufacturing operations. The school-house has been built expressly for its present object. It contains, besides private apartments for the master and mistress, a boys' school-room measuring eighty feet by thirty-six, a girls' school-room nearly as large, and a class-room for lectures, &c., between the two. One of the rooms contains an organ. In the boys' school there are benches arranged on the class or monitorial system, each bench having a kind of shelf beneath it, on which the boys place their caps, and a monitor's seat which is also a box for containing books. Although intended principally for the factory children, yet these schools are open to all the children in the neighbourhood of the factory, whose parents choose to adopt the regulations laid down for its good governance. By the operation of the Factories Act, all the children in a factory are bound to attend school for a certain period each day: those who work in the forenoon must attend school in the afternoon; those who work in the afternoon are at school in the forenoon Hence there is a distinction in the schools belonging to Messrs Marshall between the 'half-time hands' and the other scholars, the former being those engaged in the factory, and under the influence of the Factories Act, and the latter being other children living in the neighbourhood. Altogether there are about three hundred and fifty boys, and a hundred and eighty girls who are under the care of a master and mistress engaged expressly for the school. The school-rooms are comfortably warmed by hot-water apparatus; and there is a large plot of ground outside the building which serves as a play-ground. As to the internal discipline of the schools, there is the same busy hum, the same thumbing of slates, pencils, and books, the same mixture of the slow-moving with the quick-moving intellect, of the meek and placid boy with the young rogue who looks as if he loved marbles better than books, as in most schools. The boys mostly wear a kind of short pinafore made of coarse flaxen cloth, called a 'harding' or 'harden'; and their appearance on the whole is certainly indicative of good health and high animal spirits.

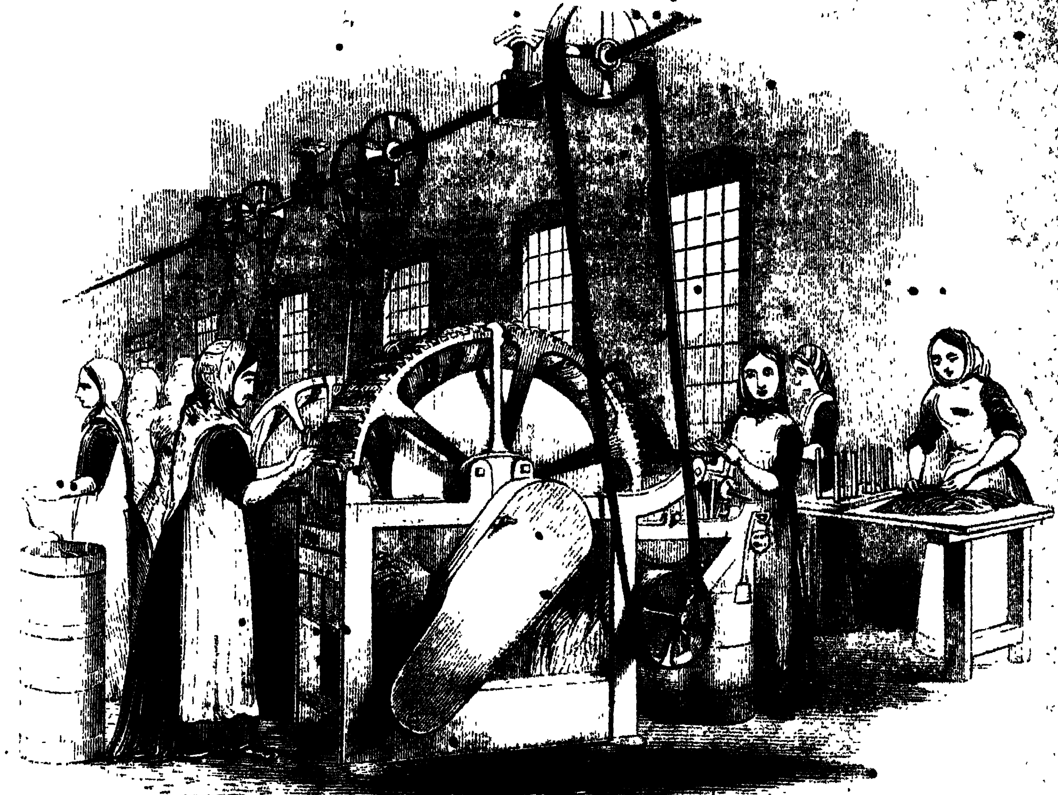
Let us now see what are the processes to which the flax is subjected in this factory. The material comes thither in the form of small bundles called 'heads,' measuring probably two feet in length, and weighing a few pounds each. These heads of flax are taken to one of the upper floors of the building, where the preparatory processes are conducted This upper floor exhibits one of the most busy scenes that can be conceived. The whole area is covered with machines of one kind or other attended by a multitude of work people, chiefly young boys, and as the flax has in it much more dust and dirt than are found in cotton, silk, or wool at an analogous stage of the process, the atmosphere of the room contains a larger amount of floating dust, to remove which large fans or blowing-machines are employed.

When the heads of flax are ready for working, they are 'scutched' out at the ends, that is, they are held in a machine which subjects the ends of the fibres to a rude sort of combing or beating. They are then cut or broken in two places, so as to divide each fibre into three portions, which are of different qualities, the middle one being the best. There are distinctive names applied to flax of different colours; thus the 'bloe' is the dark-coloured, and the 'white' is the light-coloured portion.

Then ensues a chain of processes so continuous and so remarkable that it may be deemed the most charac-

teristic part of flax-dressing; this is the *heckling*, a process which separates, straightens, cleanses, and in some cases splits the fibres. In the domestic system of manufacture the process of heckling is thus carried on:—The instrument employed, called the *heckle*, is a square piece of wood covered with rows of iron teeth about four inches long. The fineness of the heckle is chosen with reference to the quality of the flax, and heckles differing in this respect from each other are used in succession, the coarsest first, greater degrees of fineness next, and the finest to give the last degree of smoothness and finish to the flax. The operation of heckling is performed by the workman grasping a handful of flax by the middle, and first drawing one side or end, and then the other, through the teeth of the heckle, until every particle of extraneous matter is removed, and the whole of the filaments are arranged in distinct, even, and parallel layers.

But with the modern heckling-machines the process is very differently conducted. There is a series of



[Flax heckling.]

twelve or fourteen machines, arranged in two rows, and attended by about eighteen hands, mostly children; and every handful of flax has to pass successively through all these twelve machines, and under the care of all these eighteen work-people, during the process of heckling. There is, too, so much bustle, passing to and fro, and handing from one to another, that the contrast between this process and the preparation of cotton is very marked. In the first place there is a kind of bench or table midway between the two rows of machines, at which children are engaged in fastening the flax into iron clasps or holders. These clasps are long frames capable of admitting the handfuls of flax, which they hold tightly at one end, leaving the other end of the flax floating freely; nuts and screws being employed to fix the flax in the clasp. When several clasps are thus filled, other children take them one by one, and adjust them to the surface of a cylinder, until the cylinder is supplied with its proper portion of flax, ranged in several rows parallel with the axis. This cylinder is then made to rotate, and the floating or free end of the flax, while sharing in the rotation of the cylinder, meets with a range of teeth or combs, by which it is combed out, and cleansed from the coarser impurities which may remain among the fibres. The machine is then stopped, and the frames or clasps containing the flax are taken from it and placed on the cylinder of the second machine in the row, differing in no degree from the former, except in having a finer comb or heckle to act upon the flax. When this second heckling is finished, the clasps are in like manner removed from the second machine and placed upon the cylinder of the third, where the heckling process is again performed, but by a heckle rather finer than either of the former. So it goes on to a fourth, a fifth, and a sixth machine; all being ranged in a row, all being similar in their general mode of action, but each one presenting finer heckle-teeth, and therefore reducing the flax to a state of greater fineness and smoothness than the one which preceded it. It is a very general principle in the cotton manufacture that the material transfers itself from one machine to another with scarcely any interference on the part of the work-people; but there is probably something in the nature of flax-preparation which renders that continuity of action unattainable. Among the eighteen young operatives engaged at this set of machines, each one has a particular duty to perform, and all are occupied very actively.

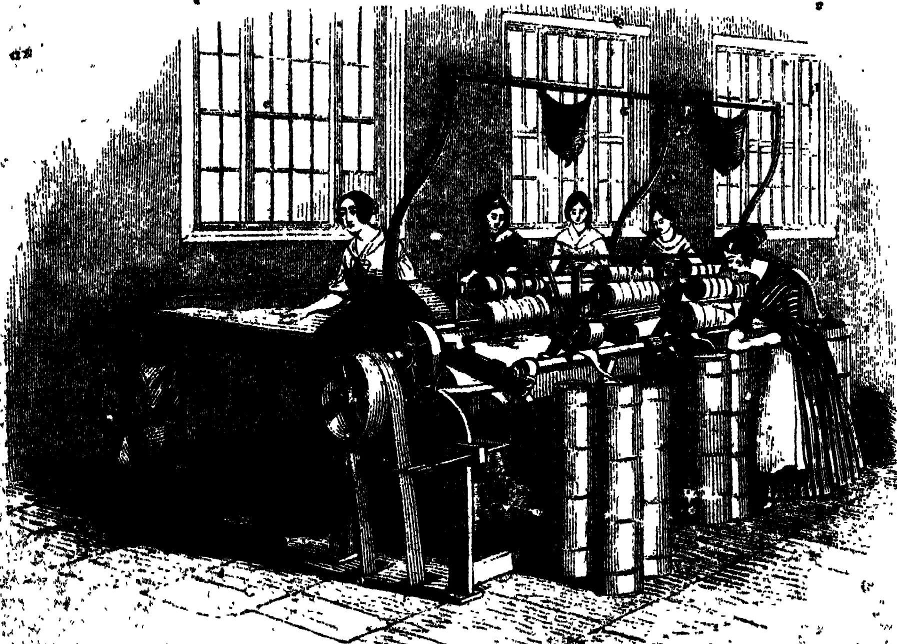
The six or seven machines, of which we have spoken, heckle the flax in one half of its length only. It is not removed from the clasps during the above transfer, and

therefore each fibre is combed or heckled only at the part which is free or untouched by the clasp. To heckle the clasped portion is the operation of the remaining machines and their attendants. When the clasps are taken from the sixth machine, they are not put upon the seventh, but are carried to the bench between the two rows of machines, where some of the children unscrew the clasps, release the hitherto confined end of the flax, and clasp it by the other end; all which is done with singular quickness and dexterity. As fast as the flax is thus clasped, the clasps are taken by other children, and placed upon the first machine of the second series, where the rough and unheckled ends undergo their first heckling. From this machine the clasps are removed to a second, and from thence to a third, a fourth, a fifth, &c.; until at length every fibre of flax has been heckled from end to end six or seven times, and the whole rendered soft, silky, and glossy. The very great attention paid to the process of heckling is one of the circumstances to which the recent progress of the flax manufacture may probably be attributed; since the beauty of the yarn afterwards to be produced depends very much on the cleanness and smoothness of the flax.

There are other kinds of heckling-machines employed under some circumstances. One of these has a double kind of comb by which the flax is heckled on both sides at once. The mechanism is so arranged that the teeth act first on the extreme ends of the flax, and gradually go deeper and deeper, till the whole length of the fibre comes under their operation.

We have next to follow the heckled flax to the rooms where it is further prepared for spinning. From the heckling-room the flax is carried to the sorting-room, where there are a number of men provided with boxes divided into numerous compartments. The heckled flax being laid out on a bench or table, the sorters examine it by small portions at a time, and separate it into many different qualities, according to the fineness and fitness for different kinds of yarn. This is an operation requiring much of that discrimination of touch which is observable in wool-sorting.

It will be remembered that the flax, so far from being in one continuous band or sliver, is yet only in the form of distinct fibres, each about ten inches long; and the process which it next undergoes has for its object the combining of these fibres into the continuous band just alluded to. This is analogous to processes exhibited in the cotton and woollen manufactures, so far as the main features are concerned. The flax, after being laid on a travelling apron, is conveyed by heckle-teeth to a series of small rollers, which 'draw' it out into



[Drawing the heckled Flax, or 'Line.']

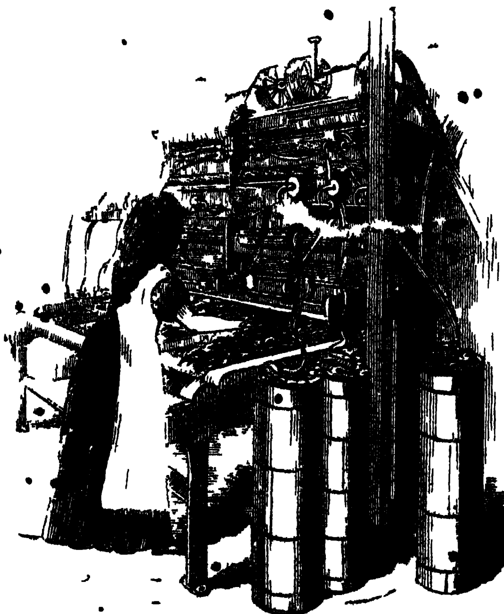
a continuous sliver or riband. Over and over again is this process repeated, the continuous sheet or band of flax being doubled and re-doubled, and carded after each doubling, until it presents an uniform width and thickness in every part. At one time it is exhibited in the form of a narrow band about an [illegible] in width, and this by subsequent [illegible] extension is diminished to a beautifully [illegible] and glossy band an inch in width. All the [illegible] extended bands fall into tall cylindrical [illegible] thence conveyed to other machines [illegible] process is conducted, until at length [illegible] and thickness is ob[illegible] equality is pre[illegible] from being [illegible]

We must here speak of the *tow* which results from the preparatory processes, and of which mention has not yet been made. When the flax is fitted into the clasps and adjusted to the heckling-machines, the heckling-teeth not only comb out the fibres straight and parallel, but also remove irregular, short, or defective fibres, as well as dust and dirt. The dirt falls to the bottom of the machine, and is thence removed; but the waste fibres cling to the teeth of the heckle, and there remain during the process of heckling. When the clasps are removed in order to be transferred to another machine, the heckle-teeth are seen to be full of flaxen fragments, and these fragments, constituting *tow*, are, by means of an apparatus attached to the machine, removed from the teeth in the form of a continuous sliver, so that while the machine is



[Doubling and Drawing.]

heckling the fibres of good flax, it is also making a band or ribbon of the inferior portion. Each machine produces its own portion of tow sliver; but as the flax itself becomes finer and finer in proportion to the number of heckling-machines through which it has passed, so do the tow slivers become finer and finer, and they are thus capable of being classified into six or eight different qualities. In the language of the factory the flax ceases to be called by that name after it has passed through the heckling-machines: the good portion is then called *line*, and the inferior *tow*; both are afterwards spun into yarn, but the yarn so produced has different degrees of excellence. Other machines are used by which tow is converted into slivers by carding, analogous to cotton and wool processes.



[Tow-card.]

When the slivers, whether of *line* or of *tow*, have been brought to the desired breadth, thickness, and equality, they are carried to the 'roving-machines,' where they are transformed to the state of a soft, small, cylindrical cord. There are two combined movements whereby this is effected; the sliver is drawn out or elongated, and it has a slight twist imparted to it as a means of enabling it to adhere and to bear the subsequent action of the spinning-machines.

These spinning-machines we have next to notice. They are on the 'bobbin-and-fly' principle, 'mule-spinning' not having, we believe, been introduced in the flax manufacture. These machines constitute the main feature in the great room of the new mill. The drawing, roving, and spinning, being comparatively clean processes, are here conducted; and great care is observed in maintaining not only a given temperature, but also a given degree of moisture in the air. There are both hygrometers and thermometers in the room, to indicate the state of the air at any given time. Flax, unlike cotton, silk, wool, or worsted, is spun wet, as a means of obtaining a finer and smoother yarn; and within the last few years the use of warm water, instead of cold, has been introduced for this purpose. The same flax, prepared in the same way, can be spun to a much higher number, or much greater degree of fineness, with hot water than cold; and this is doubtless one of the improvements to which the recent progress of the flax manufacture may be attributed. The spindles by which the yarn is spun revolve some thousands of times in a minute, and the wet yarn thus throws off a continuous spray by the centrifugal force thereby generated: the girls and young women who attend the machines wear therefore a kind of thick apron to protect themselves from the spray. The water is contained in a kind of oblong trough attached to each machine, and steam is admitted by a small pipe as a means of bringing the water to the required temperature.

When the yarn is spun, it is destined either for weaving, or for thread. If for weaving, the yarn is reeled into hanks on a hexagonal reel, to be afterwards made up into bundles of twenty hanks each, containing sixty thousand yards. But if the yarn is to be made into thread, it is carried to other machines in the same room, where two yarn-threads are twisted together, and converted into the hard and firm thread used in needlework and lace-making. The process of thread making is also carried on at a factory belonging to the same firm at Shrewsbury.

Here, then, the operations of a flax mill terminate. If the flax yarn is woven into any kind of linen or flaxen fabric, that is an additional feature. At Messrs. Marshall's works the operations cease when the yarn and thread are produced, and we believe the same to be the case in most flax-mills. We will, therefore, glance in other directions to see how the flax is worked up into cloth.

Barnsley in Yorkshire, Dundee in Scotland, and Belfast in Ireland, are the three centres of the linen and flax cloth manufactures, mostly conducted on the domestic or hand-loom system, but in other instances on the factory or power-loom system. The flax-fabrics woven in and around Barnsley consist of linen, duck, check, drabbet, tick, huckaback, diaper, drill, towelling, and a mixture of flax and cotton called 'union.' These goods are, generally speaking, not made in large factories; but there are 'manufacturers' at Barnsley and some other towns in Yorkshire, who purchase flax-yarn from the spinners, and give it out to hand-loom weavers, who weave it into cloth at their own homes, bring it back to the warehouse of the manufacturer, and receive payment for their labour.

In Scotland, Dundee takes precedence in coarse, flaxen and hempen goods, and Dunfermline in fine linens, such as shirtings, damasks, and table-linen. Sheeting, bagging, sacking, sail-cloth, and dowlas are made to an immense extent in Dundee, where indeed this kind of manufacture is more prominent than any other, and forms at present the staple of the place.

[illegible] of the enormous width of eight [illegible] Dundee; and we believe that nearly [illegible] manufacturers of London obtain [illegible] either from Dundee or from [illegible] in Scotland. The flax-manufacture in [illegible] also made such rapid progress, that [illegible] and sheetings come into the market [illegible] which the weavers in other places can [illegible] compete with. In 1839 there were about five [illegible] hand-loom weavers engaged on linen fabrics [illegible] and we believe that the power-loom has [illegible] been very extensively introduced into the [illegible] the Dundee mode of conducting the manufacture being very similar to that in Barnsley.

In the year 1840, the Commissioners on the Hand-loom Weavers Enquiry published reports from some of the assistant commissioners; and among these reports [illegible] from Mr. Otway and Mr. Muggeridge give some [illegible] details concerning the linen-trade of Ireland, of which we will here avail ourselves.

The [illegible] fabrics woven in Ireland are chiefly fine [illegible] linens, canvas, sacking, and damask. The [illegible] the manufacture at present is very [illegible] from what it was at the beginning of the [illegible] century. At that time each weaver bought or [illegible] and prepared his own materials, from which he [illegible] web, and sold it in the public market, [illegible] private contract, to agents or travellers who went [illegible] the country making purchases. Those weavers who had more than one loom intrusted them either to [illegible] members of their families, or to apprentices or journeymen, under their own personal inspection. The latter were frequently remunerated by what was termed 'the fourth penny,' that is, each journeyman received as his wages for weaving a piece of cloth, the fourth part of the gross sum for which such cloth was sold. Out of the remaining three-fourths the owner of the loom derived his profit and the cost of the yarn. Many weavers who were small farmers also, had from three to six or eight looms in their houses. The spinning and various preparatory processes which the flax underwent were chiefly performed by the female branches of the family; and the owner, his apprentices, and journeymen worked either at the loom or in the [illegible] according as the season or other circumstances rendered most advantageous.

But at the present time the manufacture is conducted on four different systems:—1st. The weaver [illegible] his own account, holding at the same time a [illegible] 2ndly. The weaver is a 'cottier,' [illegible] for manufacturers without holding land; [illegible] The weaver works for manufacturers, and has [illegible] a farm; 4thly. The weaver works for [illegible] in a weaving-shop or factory. The last-named of these systems is the one which is now growing more into use; it is said to be not much relished by the hand-loom weavers, as there is a kind of stringency [illegible] regulations to which they were not before [illegible]; but it is said by the Hand-loom Commissioners that the weavers can earn more in a given time [illegible] under the old system, besides being freed from [illegible] irregularities to which hand-loom weavers are [illegible]. It is, however, in some one of the first three [illegible] the Irish linen-weavers are to be seen most [illegible]. The Irish weavers as a body seem to love freedom and a potato rather than factories and better food. The Assistant Hand-loom Commissioners state that they visited the cabins of some of the weavers, and found them in the lowest depths of filth, squalor, and wretchedness, but that the inmates were still cheerful and—if such a word may be used—apparently contented. Under the domestic system of weaving, where the weaver has to go and buy his yarn, and then go to market to sell his woven cloth, the loss of time is seriously great; but this source of loss, is not the only one: the habits and customs of the people lead to a formidable list of such losses. A weaver on one occasion undertook to prove to Mr. Muggeridge that an Irish weaver's year contains only two hundred days, and the demonstration would be laughable were there not reason to believe that there is too much truth in it. "I confess," says Mr. Muggeridge ('Hand-loom Weavers' Report,' p. 726), "that the proposition was new to me, and my informant, with perfect gravity, thus logically and, as he considered, unanswerably demonstrated it:—'You will allow,' said he, 'an Irishman has fifty-two Sabbaths on which he should not work?' 'Granted.' 'There then is fifty-two days. Not an Irishman in the county Armagh that does not attend at least one market weekly: there go fifty-two more days. Where's the man, if he be at all respectable, that won't devote his afternoon or half-day to the wake or funeral of his friend or neighbour? and it's a poor neighbourhood that there won't be one death in a week: there go twenty-six days more. Then, you know, there are our saint-days, and our holy-days, and our birth-days; [illegible] may be Dan will be getting up a precursher or a tithe-meeting, or the likes o' that, which a man is bound to attend for the love of ould Ireland. And now make your reckoning, and see whether a man will have more than two hundred days in a year he can call his own.'"

When Mr. Otway was making his inquiries at Drogheda, it happened from some cause or other that the hand-loom linen-weavers were earning less than in any other part of Ireland; they did not even seem to know that others were earning higher elsewhere. "A person ignorant of Irish economy," says Mr. Otway, "would decide that a weaver earning but three shillings and four-pence per week, and having a family of six to support, must starve; but this is not the case, though, poor fellow! he and his are badly off. With the manure he collects (and in this respect he and all his family are industrious), he is able to plant as much potatoes [illegible] from three to four months on ground obtained gratis from some neighbouring farmer, who is glad to give the potato-crop for the sake of the corn-crop which the manure will enable him to obtain next year." The man's earnings are applied to [illegible] the supply of provisions, to pay rent, and to procure clothes, while the wife and children fatten a pig, or sell eggs and poultry, or go out begging among the small farmers in the vicinity; so that the means of obtaining subsistence are derived from many different sources. In other parts of Ireland the linen and canvas weavers were earning somewhat better wages; and there is now going on a gradual transition towards the factory arrangements of the linen trade.

END OF VOLUME THE TWELFTH.

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